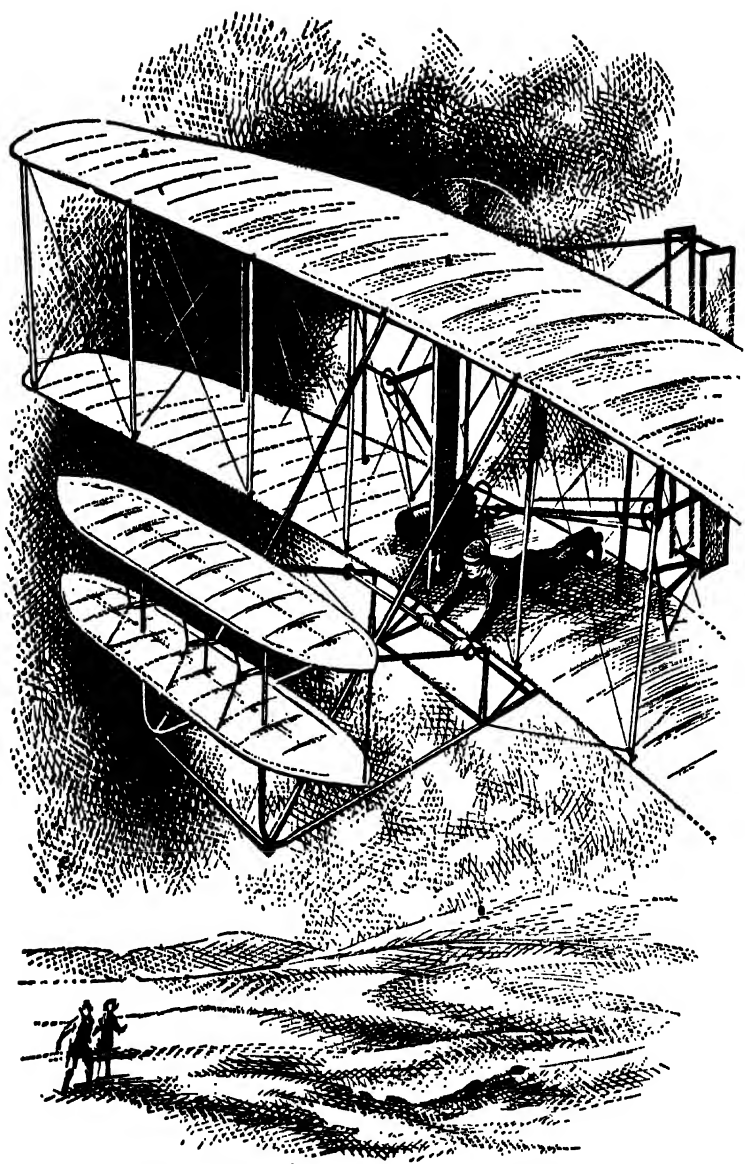


THE WRIGHT BROTHERS



LIVES TO REMEMBER



THE FIRST HUMAN FLIGHT IN THE HISTORY OF THE WORLD

(see page 62)

LIVES TO REMEMBER

THE WRIGHT BROTHERS

BY

HENRY THOMAS

Illustrated by W. Francis Phillipps



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THE WRIGHT BROTHERS

CHAPTER I

WHY?

FROM the very beginning the two boys grew up with a question on their lips: Why? They wanted to know the reason for everything. 'Why do the birds fly? And why can't we fly like the birds? Why don't we make wings for ourselves? Why—why—why?' It was quite a problem for the parents to cope with their children's curiosity. They tried to answer the questions as well as they could. But at times they lost their patience—especially with Wilbur. He was four years older than Orville, and he ought to know better. After all, even a parent doesn't know the answer to everything.

When the parents couldn't give the correct answer, the boys tried to find out for themselves. Even Orville, who was only five, took things apart and put them together again, just to see why they worked as they did. Shortly after his fifth birthday, his mother took him to a kindergarten. A couple of weeks later she visited the school to find out how Orvie was getting on.

'Orvie?' asked the teacher with a look of amazement on her face. 'I haven't seen him since the first day. I thought you had decided to keep him at home for another year.'

'That's funny,' said Mrs. Wright. 'He leaves the house every morning right after breakfast, and he returns promptly every day at noontime. I wonder what the child is up to?'

After due investigation, she found out. Orvie had been spending all his school hours at the house of a playmate,

Ed Sines. But he was careful to watch the clock, and left for home promptly at twelve.

'But what have you been doing at Ed Sines' house?' asked Mrs. Wright.

'We were trying to mend a sewing machine. It belongs to Ed's mother.'

'What's wrong with it?'

'It made too much noise. Ed's mother said it needed lupracating.'

'You mean lubricating,' corrected Mrs. Wright.

'Yes, Ma. So Ed and I decided to lubricate the machine.'

'How?' asked Mrs. Wright.

'We put some water on a feather and we sprinkled it into the holes of the machine.'

'The child,' remarked Susan Wright to her husband, 'will grow up to be either an idiot or a genius.'

'Pray God it will be the latter,' smiled the Reverend Milton Wright. He was a travelling minister, and he was away for weeks at a time. But whenever he came home, he brought some mechanical toys for the two youngsters to play with. He had a scientific turn of mind himself, and he wanted the boys to grow up into good engineers. 'It is my business,' he said to them, 'to direct people's eyes toward heaven. Let it be your business to keep their feet planted on the earth.'

One of the toys he brought them was a top that kept spinning round and round while its point rested on the edge of a knife blade. Another and even more marvellous toy was a contraption of bamboo sticks and tissue paper. He called it a *hee-li-cop-ter*. It had two oarlike propellers—one at the top and the other at the bottom. When the boys wound up the propellers, the toy flew straight up into the air.

'It's a flying machine!' cried Orville when he saw it rise from the ground.

'Yes,' echoed his older brother. And turning to his

father, he said, 'Some day I'd like to make a machine that really flies. You know, just like a bird.'

His father smiled, but allowed his son to go on. He tried not to interrupt his children's thoughts, just as he expected them not to interrupt his own thoughts.

'You've often told us,' continued Wilbur, 'that you want us to keep our feet on the ground. Well, I'm not satisfied with that. There's something that keeps pulling at me all the time. I want to fly!'

'Me, too!' Orville piped up.

Their father smiled indulgently. 'It's an impossible dream, I'm afraid. For thousands of years the greatest minds have tried to realize this dream, and they have failed. You had better give up the idea. You can never fly.'

The boys looked disappointed, but said nothing.

'I tell you what,' said Mr. Wright. 'Suppose you concentrate on the things you *can* do. Helping around the house, I mean, and earning a little money after school hours.'

'Doing what?' asked Wilbur.

'How about washing dishes for a start?'

So the boys got their first job—as dishwashers for the family, at the rate of one cent a day. Orville felt quite rich with his earnings, but Wilbur wanted more work and more pay. He got a job collecting scraps of metal for a local junk dealer. His earnings rose to about five cents a day.

Orville, too, got another job for himself. He had become dissatisfied with his pay when he saw the 'fabulous' salary of his elder brother. He began to collect bones in the back yards and alleys for a fertilizer factory. He had a number of fights with the neighbourhood dogs who resented giving up their bones. But Orville managed to make his collections without a single bite; and he earned as much as three cents for a heavy load of bones.



As for the dishwashing, the boys left this job to their sister Kate, who was younger than Orville and therefore wanted less money for her 'needs'.

Yet with all their hard work, the boys found plenty of time to play. They were especially fond of kite flying. One day a heavy wind lifted Orvie off his feet as he sent his kite into the air. 'Look, Will,' he cried, 'I'm flying!'

Wilbur's first thought was for his little brother. 'Let go,' he cried, 'or you'll get hurt!'

Orvie released the string and fell to the ground. Fortunately he was unhurt. Wilbur ran over to pick him up. 'Yes, Orv,' he said, 'you sure were flying!'

So a kite could almost fly like a bird. And if you held on to the string, you could fly along with it!

Yet it was a dangerous thing to do. The wind would carry you whichever way it pleased. But with a bird it was different. A bird was able to *steer* itself through the air.

Why couldn't you do it with a kite? *Steer* it through the air. Wilbur talked it over with Orville. To them it seemed quite possible. When they spoke about it to their father, however, he shook his head. 'A foolish dream!' he declared.

Wilbur looked into his father's eyes and said, 'why?'

Mr. Wright shrugged his shoulders. This was one of the questions to which he had no answer.

CHAPTER II

SLIDE UNDER THE WIND WHEN YOU TRAVEL.

THE children of Milton and Catherine Wright came of a distinguished family. On their father's side they were distantly related to General Warren, hero of Bunker Hill, and to President Grant. On their mother's side, too, they had a number of gifted ancestors—especially in the field of science. Milton Wright had met Catherine Koerner at Hartsville College in Indiana. Milton was one of the brightest students in literature, and Catherine led her class in mathematics.

All the Wright children—Reuchlin, Lorin, Wilbur, Orville and Kate—inherited their parents' ability. But Wilbur and Orville were the mechanics rather than the scholars of the family. They were always busy repairing old gadgets or building new ones. And they kept their eyes open to the wonders of the world as they travelled from place to place, for the Wrights, as the father smilingly observed, were 'a family on the wing'. His duties as a minister had compelled him to travel from one church to another. Whenever possible, he made his journeys by himself, leaving his family at his headquarters in Dayton, Ohio. But in 1878 they all moved to Cedar Rapids, Iowa. Milton Wright had become a bishop, and he could now afford to have his family near him. At the time of their arrival in Cedar Rapids, Wilbur was eleven years old and Orville seven.

In 1882 the Wrights moved once more—to Richmond, Indiana; and in 1885, there came another transfer—back to their old headquarters in Dayton.

These repeated moves from city to city didn't help the children in their schooling. The work was somewhat different in the various schools, so that every transfer meant a new adjustment and a consequent setback. Wilbur and Orville, therefore, had no particular fondness for their formal education. But they enjoyed their informal contact with new scenes and new faces.

And they were especially delighted with the adventure of travelling. 'The only trouble,' complained Wilbur, 'is that it takes so much time to get from place to place.'

'Too bad you're not a bird,' his brother Reuchlin taunted him. He and Lorin liked to poke fun at Wilbur's 'impossible' dream about flying.

Lorin nodded. 'I've seen him lie on his back,' he said, 'watching the birds in their flight for hours at a time.'

'Maybe,' laughed Reuchlin, 'he expects to sprout wings one of these days.'

'Maybe I do!' retorted Wilbur.

His two older brothers had little sympathy for his interest in birds. 'You'd do better,' Reuchlin advised him, 'if you spent more time on your history.'

'I know my history as well as you do!' snapped Wilbur.

As a rule, however, he tried to avoid arguing with his older brothers. It was much more fun talking to Orvie, who shared his dreams. In spite of the difference in their ages, the two younger boys loved to work and play together. Lorin was right. Wilbur did spend many hours, with Orvie at his side, watching the birds in the air and trying to discover the secret of their flight.

'Look at them,' said Wilbur. 'Sometimes they flap their wings in the air, and you think maybe that's what makes them move ahead. But sometimes they hold them straight without any flapping at all. And what makes them move then?'

'Maybe,' said Orville, 'it's the curve in the wings that makes them stay up in the air. Orville had an observant

eye and a quick mind. 'Wilbur,' their father used to say to their mother, 'is the mathematician, but Orville is the inventor.'

And Orville was the artist with the imagination. One day, as they watched a buzzard above them, he said to Wilbur: 'You know what I wish? I wish I could sit on the back of that bird with reins in my hand. And then I could steer it in any direction and fly wherever I liked.'

'I think,' said the more practical Wilbur, 'you'd be better off if you *lay down* on the bird. When you sit up, you face the wind with your whole body. But when you lie down, you can slide *under* the wind. And then you can fly so much faster.'

The following winter the boys were able to put Wilbur's idea to a practical test. They had a toboggan race on a hillside—Wilbur, Orville, Ed Sines and several of their friends. The other boys sat up on their toboggans; but Wilbur and Orville stretched themselves out flat. They cut through the air like a knife and reached the bottom of the hill far ahead of their competitors. 'That's because we didn't have to fight the wind like the rest of you,' Wilbur explained to them.

The two brothers applied the same principle in another race. They had become interested in bicycles. They liked to tinker with them, to see—as usual—'what makes them tick.' One Saturday Orville challenged his friends to race their bicycles with him. Some of the boys, whose parents could afford it, had brand-new bikes. As they lined up for the race, they looked at Orville with a mingled feeling of pity and contempt. His bicycle was the oldest and most disreputable vehicle in the race. He and Wilbur had patched it together out of old parts they had picked up in a junk yard. And it had one peculiarity which especially aroused the other boys' ridicule. Its handle-bars were considerably lower and closer to the wheels than any of the others.

'What's the matter with those handles?' jeered Ed Sines. 'Couldn't you find an extra bar in the junk yard to raise them up a bit?'

'Perhaps,' suggested another, 'he wants to lie down on his bike and have a snooze.'

'Might as well,' offered a third. 'Even if he's wide awake, he'll never get anywhere with that crazy contraption.'

All this was said in a spirit of good-natured fun. And Orville grinned back at his friends in the same spirit. In the meantime, the starter had lined up the contestants.

'Ready? On your mark; get set; go!'

Away they went! The other contestants sat straight up, holding on to their handles from their stiff, upright position. But Orville was leaning low over his handle-bars. He and Wilbur had built them close to the wheels on purpose. He was sliding *under* the wind as he rode, while the others had to fight *against* the wind.

And to everybody else's but not to his own surprise, Orville won the race hands down.

As he explained the secret of his success to his astonished friends, Ed Sines declared: 'I should have known it! You two wizards are always stumping us with your magical tricks!'

'No trick at all,' laughed Orville. 'Just scientific fact and common sense.'

CHAPTER III

'HE'LL NEVER BE WELL AGAIN . . . '

THE Wright boys made all sorts of experiments on mechanical gadgets. Orville invented the ideas, Wilbur drew the plans on paper, and both of them worked out the ideas in accordance with the plans. In this way they built carts to collect junk, lathes for shaping some of their tools, and bicycles of different shapes, sizes and speeds.

One day Orville's inventive mind prompted him to concoct a sort of chewing gum. He cut a hunk of tar into small pieces, flavoured them with sugar, and wrapped them in tissue paper. 'I'm going to get rich on this,' he boasted to his brother.

'Before you foist it on the public,' Wilbur suggested, 'try it out on yourself'.

Orville tried it on himself and almost died as a result. He decided to return to his more practical projects. He organized a 'mammoth [*sic*], colossal and stupendous' circus and built a 'float' for the parade through the city. The float consisted of several long planks attached to the wheels of an old carriage. Seated upon the float was 'a variety of thousands of rare birds and beasts'—as he announced it in a local paper—'gathered from the four corners of the earth.' Actually it was a small group of parrots, canaries, cats, rabbits and other pets collected from friendly neighbours. The float was driven by a 'horde of roman slaves'—a number of little boys who had volunteered their services for this gala event. At the head of the procession rode 'the circus master', Orville Wright, upon an 'iron horse'—a high-wheeled bicycle which he and Wilbur had built out of old junk.

Orville had secured a couple of partners for the circus. One of them, Gansey Johnston, lived next door to the Wrights. Gansey's father was interested in taxidermy. He kept a collection of stuffed birds and animals in an old barn. He gave the boys the use of this barn, together with his stuffed specimens to add to the cast of live animals. All in all, it was quite a show.

The price of admission to this 'stupendous circus' was five cents for grown-ups, three cents for children. The boys made a handsome profit on the affair.

Orville also made a nice profit from another idea, building kites for his playmates. Wilbur, who had stayed somewhat aloof from the circus, threw himself heart and soul into Orville's kite-building experiments. This was a scientific venture which challenged his own as well as his brother's ingenuity.

At first they made their kites following the old pattern—frames of crossed sticks covered with thin paper that belled out in the wind. The boys had become interested in this 'bellying behaviour' of the kites. 'It looks as if the air supports them just as the water supports a boat,' observed Wilbur.

'Yes,' replied Orville. 'And this gives me an idea.'

'What is it?'

'Suppose we made a kite with two wings instead of one. Then the wind could support both of them, and the kite could fly all the better.'

'Sounds reasonable,' nodded Wilbur. 'Perhaps I ought to make a drawing of it and see how it looks on paper.'

'Yes, Will, suppose you do.'

Wilbur made the drawing, and then they went to work on the kite with the two wings, one above the other.

This kite, because it was much bigger than the others, had to be made of lighter material. Otherwise it couldn't stay up in the air. The boys got wood for the framework and tissue paper for the covering. The result, however, was

not satisfactory. The kite flew into the air all right, but the wind tore the paper and twisted the wood out of shape. 'We'll have to try again,' said Orville.

So they tried again, and again, experimenting with wooden strips for the framework, and with various kinds of paper and light cloth for the covering, until they succeeded in building a kite that they could fly without breaking, and that they could sell.

They got thirty cents apiece for them. Their kites flew higher and stayed longer in the air than any of those that were being sold in the shops. Their friends were delighted with them. Wilbur and Orville could have gone into the kite-manufacturing business then and there.

But they had their education to attend to. Wilbur was now at high school and Orville was in one of the higher forms in the grammar school. Wilbur was planning to go to Yale, and Orville hoped to follow in his brother's footsteps.

The parents had little enough money saved for their children's college education—Bishop Wright's salary was only \$1,500 a year. But they felt certain that their boys would make their own way. 'Will and Orv,' declared their mother, 'carry powder under their heels. They'll get along all right.'

But suddenly Wilbur's college dream came to an end. One day as he was playing hockey in his senior high school team, he received a severe blow in the mouth. He lost several teeth and had to stay in bed for about a month. His mouth had become infected and he was able to take only liquid food which he drank through a tube.

When he finally got out of bed, he suffered from stomach trouble for many weeks. His heart became weakened and the doctors were afraid he would never be himself again.

But Wilbur was a fighter. He was determined to get well. He spent the long hours of his convalescence reading

the books in his father's library. He was especially interested in the works on science and invention.

As he grew stronger, he and Orville spent a great deal of time making their home more comfortable. They remodelled the interior, doing all the lathe work on their own machine. They rearranged the garden behind the house. And they built a sheltered verandah for their mother.

Mrs. Wright needed the fresh air. For some time she had been suffering from tuberculosis. Wilbur, who at that time was also an invalid, had taken it upon himself to care for her. And never had anyone been blessed with a more tender nurse. For four years he watched over her, fed her, carried her from bedroom to verandah and back, and—as the doctor expressed it—'kept the angel of death away from her bed'.

But at last, on July 4th, 1889, she died. 'The four years I spent with mother,' he said afterwards, 'gave me my college education. I learned much from my father's books. But I learned even more from my mother's wise talk and gentle love.'

Just before her death she had called him to her side. 'Get well my son,' she said. 'I expect great things of you.'

CHAPTER IV

THEY COULDN'T KEEP STILL

AFTER their mother's death the two elder boys—Reuchlin and Lorin—went to live by themselves. Kate entered Oberlin College; and Wilbur and Orville stayed at home with their father.

In spite of the doctor's fears, Wilbur was recovering well from the results of his accident. He was almost ready to continue with his normal activities. But he had lost valuable time, and his younger brother had got ahead of him in the business world. Impatient to earn his own living, Orville had left high school and opened a little printing shop in partnership with his friend, Ed Sines. Bishop Wright had bought the boys a twenty-five-pound fount of type. 'But,' objected Sines, 'what's the good of type without a press? And we have no money for a press.'

'If we can't buy it,' declared Orville, 'we'll build it.'

They got Wilbur to draw the plans and set about building the press. They found a heavy iron roller in a dismantled mill, and an old gravestone for the bed on which to put the sheets of paper for printing. They rubbed both the roller and the bed smooth with sandpaper. Then Orville rigged up a couple of levers, one at each end of the roller. With the boys stationed at the two levers, they could turn the roller to and fro and print the paper that had been placed on the stone slab. 'All we need now,' said Orville, 'is to set up the type and ink the roller.'

'But first we must get the business,' observed Ed.

'Don't worry about that!' cried Orville cheerfully. 'We'll charge less than the other printers, so we'll get all the business we need.'



And they did. Before many days, they were able to save several dollars over and above their expenses.

One day Orville suggested that they publish a newspaper in addition to doing their general printing. 'Let's start with a small paper,' he said, 'and let's call it *The Midget*.'

'All right,' agreed Ed Sines, 'I'll get the news and you do the printing.'

So Ed Sines became a reporter—but not a very good one. The paper was to consist of four handkerchief-sized pages, with three columns to a page. It was to be published once a week. At the end of the first week, when Orville set up the type for printing the paper, he found that he had been given enough material for only three pages. 'I'm afraid we'll have to put off publication for another week,' said Ed with a long face.

'No,' objected Orville, 'that won't do. We've already set the date, and we can't go back on it.'

At this point Wilbur came to the rescue. He was well on his way to recovery and he took a keen interest in his brother's enterprise. 'I'd suggest,' he said, 'that you put an advertisement on the blank page.'

'Great idea!' cried Orville. And he prepared a big display advertisement for the blank page:

SINES AND WRIGHT

PRINTERS

So the paper was printed on time, and the two editors were proud of their achievement.

But it failed to satisfy Bishop Wright. He, too, was an editor—of a religious magazine. He objected to what he called 'unnecessary padding'. If the boys hadn't enough news to print in their paper, he argued, they had better print no paper at all. 'I think you ought to give up the idea



for the present,' he advised. 'Wait till you are a little older and more experienced.'

The boys took the bishop's advice. They stopped publishing *The Midget* and returned to their general printing. Orville's father had taught him an important lesson—never to undertake anything until he had planned every part of it in advance. It was a lesson he would remember again and again in his later life.

Not long after the failure of *The Midget*, the printing firm of Sines and Wright got a third partner. Wilbur, who had almost completely regained his health, asked the boys to take him in as a partner. The business prospered under the new management; and within a year they were able to deposit a thousand dollars in the bank.

They now started another paper—the *West Side News*—with Wilbur as editor, Ed Sines as handy man and reporter, and Orville as printer and mechanical engineer.

And the presses—they had now built bigger and better ones—needed plenty of attention. Orville was a genius at

repairing them when they broke down. He used all sorts of things—from pieces of rope to adhesive tape and strips of old clothing—to patch them up. One day the salesman of a printer's supply house who was also somewhat of a mechanic saw the latest of the Wright presses in operation. 'Where did you get this crazy old thing?' he asked.

'We made it ourselves,' said Orville.

'What makes it go?'

'Why don't you look and see for yourself?' replied Wilbur, who was less offended than amused.

The salesman looked at the machine from above, peered at it on all sides, and then lay down on his back to examine it from underneath. Finally he got up from the floor and shook his head. 'It works all right,' he mumbled, 'but I'm still dashed if I know why.'

And this 'crazy old thing' enabled the three boys to build up a prosperous business. The *West Side News*, with no padding or empty pages, did so well that they started a weekly magazine—*Snapshots*—written by Wilbur, managed by Ed and printed by Orville. This venture, too, was profitable. The Wright brothers were on the way to becoming successful printers and publishers. But their interest lay in other directions. At heart they were not businessmen but builders. A new industry had developed in the United States—the making and repairing of bicycles. Wilbur and Orville had done considerable tinkering in this field. Their fingers were just itching to work on gadgets. 'Suppose we open a bicycle shop,' ventured Wilbur one day.

'Good idea,' said Orville. 'I'm with you.'

'How about you?' asked Wilbur, turning to Ed Sines.

'I don't know.' Ed scratched his head. 'I think I'd rather be a printer.'

'All right, Ed,' smiled Will. 'Everybody to his taste.'

But Ed Sines was still perplexed. 'How could we manage it? I mean if you went and opened a bicycle shop? I

couldn't stay here all by myself. I haven't got the money to buy you out.'

'That's right,' said Orville, who shared his friend's perplexity. But then his face lit up. 'I've got an idea!' he cried.

'I'll bet it's the same as mine!' said Wilbur.

'Suppose you stay here, Ed,' Orville went on, 'and look after the printing for all of us. And Will and I will try to find a shop nearby, so we can run in now and then and see how things are getting along. And then, if everything is all right and you make a lot of money, you can pay us for our share and you'll be your own boss.'

'This is an echo of my own thought!' exclaimed Will. 'How about it?'

'Sounds all right,' said Ed. 'I'm willing to try it out.'

So Ed remained at the printing works, and the Wright brothers rented a vacant shop across the street. For three years they continued as part owners of the printing business and as full owners of the bicycle shop. And then Ed Sines was able to buy them out. The two boys moved to larger quarters and began to devote all their time to their growing new venture—The Wright Cycle Company.

CHAPTER V

WHAT ARE THEY UP TO NOW?

WILBUR was quite well now. He took an active part in the running of the bicycle shop. And business gave him and Orville a comfortable living. This was towards the end of the nineteenth century. The bicycle craze had swept over the nation. All America seemed to be on wheels—tricycles built for children, high wheelers designed for young men and women, and low wheelers—called ‘safeties’—constructed for grandmothers and grandfathers. In addition to the single-seated machines, there were ‘tandems’ with two or three or even four seats. One of the great achievements of the day was to become a member of the Century Club—an organization that included all those who had covered a hundred miles on a bicycle.

Wilbur and Orville were kept busy making, repairing and selling their machines. Their speciality was the tandem. Their mechanical ability enabled them to collect old wheels, brakes, pedals and chains and to assemble them into single or multiple bicycles that were as good as new. The Wright boys—they were now twenty-six and twenty-two, but they were still called ‘the Wright boys’—became a familiar sight as they rode on their tandem through the streets of Dayton. ‘Here come the boys on their monster,’ people would point to them smilingly as they saw the ‘new-fangled’ two-seater dashing down the road.

People wondered at their skill and admired their character. Wilbur, long and lean and thoughtful, was the quiet member of the firm. He enjoyed taking long rides that tested his courage and endurance. Orville, smaller and more effervescent, was the daredevil. He loved to enter



short races that required nerve and skill. But the two together made up a team of fearless determination and will to win.

Indeed, it was a perfect team of co-ordinated thought and action. They did not always agree with each other, but they generally submitted their ideas to frank discussion and came to a friendly and sensible conclusion. And then they put all their ingenuity and strength into working out the ideas they had agreed upon.

One of their workable ideas resulted in the Van Cleve bicycle. This machine, named after a Wright ancestor, possessed a new kind of brake and other special features of their own invention. It became one of the most popular bicycles of the period.

Before long their business grew too big for them to handle all by themselves. So they asked Ed Sines to come in with them. He had finally given up the printing business and was glad to rejoin his friends. He became their handy man, while the Wright boys attended to the more important work.

One of their chief jobs was to make their tools as well as their bicycles. 'We like to make our own tools,' Wilbur explained, 'because in that case we *know* they'll be right.' Wilbur winked at the intentional pun.

With their 'home-made tools' they mended not only bicycles, but all kinds of things including typewriters, adding machines and even broken watches. They came to be known as 'the boys with magical fingers'.

And they had fertile minds too. They kept inventing a variety of gadgets that lessened their work and saved their time. Their shop consisted of two stories—a repair room upstairs and a showroom downstairs. Again and again when they were working in the repair room, they were interrupted by visitors who came into the showroom. Sometimes these visitors were customers, but more often they were people who merely wanted to inflate a tyre with

the air pump that hung on the wall near the entrance.

These 'inflation' visitors were a source of continual annoyance to Wilbur and Orville. Whenever the two heard the opening of the outside door, one of them—or Ed Sines—ran down to see what the newcomer wanted. This often meant a loss of time on a job that had to be finished in a hurry. One day Wilbur spoke to Orville about it. 'What shall we do to get rid of this nuisance?' he asked.

'I'd suggest,' said Ed Sines, 'that we discontinue our service for inflating everybody's flat tyres.'

'No,' replied Wilbur, 'that wouldn't do. It wouldn't be good business, or good sportsmanship either.'

'You're right, Will,' nodded Orville. 'But I've got another idea. Suppose we arrange a series of bell signals to tell us the exact reason why anybody comes to the shop.'

'It sounds interesting but rather complicated,' Ed remarked. 'I know you're clever, but how in the world can you make bells talk?'

'Easily enough. Let's take one of the double-tone bells that we use on our handle bars, and attach it to the wall upstairs. And then let's connect the bell by two wires to the downstairs door in such a way that the opening of the door will pull the lever on the bell in one direction to produce one of the tones, and the shutting of the door will pull the lever in the opposite direction to produce the other tone.'

'Yes,' agreed Ed, 'it sounds simple as far as it goes. But I still don't understand how these sounds will tell us anything about the visitor's business.'

'Wait till you hear the rest of it. Let's take a third wire and stretch it between the air pump on the downstairs wall and a buzzer up here in the repair room. If the visitor has come in merely to inflate a tyre, the bell and the buzzer will tell us the whole story. The bell will show us just when the door opens and shuts, and the buzzer will show us just when the pump is taken off the hook and put back on again. So if we hear the bell and the buzzer, we

know it's a flat tyre. But if we hear only the bell and not the buzzer, we know it's a customer.'

'Wonderful idea!' cried Ed Sines, thumping Orville on the back. Wilbur didn't say anything but smiled his approval. They tried out the idea at once, and it worked. From that day on, they lost no further time running up and down stairs unless their signals told them that they had a real customer in the shop.

And they needed all the extra time they could find. For their interests had now extended beyond the bicycle shop. Always experimenting with strange new gadgets, Ed Sines came home with breathless reports about them. 'You'd be amazed at the things they're fooling around with!'

But Ed was secretive when anybody asked him to explain. Will and Orv had warned him to keep his eyes and ears open but his mouth shut. The most anybody could ever get of him was: 'They're trying to do things no man has ever done before.'

'What are they?'

'Just wait and see!'

The words aroused everybody's curiosity. Again and again his friends put this question to Ed Sines:

'What are the Wright boys up to now?'

And Ed would always give them the same answer:

'Just wait and see!'

CHAPTER VI

'I JUST DON'T KNOW HOW TO GIVE UP'

THOSE who saw the Wright boys at the weekends might have got some idea of what they were up to. Wilbur and Orville were flying kites. But the onlookers were slow to catch on. 'What a silly thing to do,' they said, 'a couple of grown-ups playing like kids!'

But the two brothers were not playing with their kites—they were watching them and studying their flight. They were experimenting with flat kites and box kites, and they took notes on their behaviour both in stormy and in calm weather. They also read every book they could find on the subject of wind and air currents.

This subject had aroused the interest of a number of scientists who were trying to revive the ancient dream of human flight. The brothers often discussed the unsuccessful efforts of men who had tried to imitate the birds. They recalled the legend of Icarus, a Greek adventurer who had fashioned a pair of wings and soared into the air. But the wings were fastened with wax, and the wax melted when Icarus flew too close to the sun. He fell to his death in the Icarian Sea.

The two brothers also recalled the flying experiment of Leonardo da Vinci in 1506. They had read the boast of Leonardo about his intended flight: 'The Great Bird which I have invented will take its flight from Monte Cecero (the Mountain of the Swan). This flight will fill the whole world with amazement. It will bring eternal glory to the nest where the Bird was born.'

But the flight never came off. 'The attempt failed,' wrote the son of Leonardo's friend, Fazio Cardano.

Wilbur and Orville discussed some of the later attempts at human flight—the aerial glider of the English scientist Sir George Cayley, in 1809; the flying steamer invented by another Englishman, W. S. Henson, in 1842; and the airplane built by a third Englishman, John Stringfellow, in 1848. On one occasion this last plane had stayed in the air for a distance of forty yards. But all the other experiments had failed, and even Stringfellow was never able to repeat his first success.

The Wright brothers, however, were not discouraged at these failures. Only recently a number of American and European inventors had renewed the experiments; and some of them seemed likely to succeed. One day Wilbur came into the shop with exciting news. 'Orv, I've just read about a German flier. Yes, I mean flier. His name is Otto Lilienthal. This man has built a machine which takes off from a hillside and *glides through the air!*'

'I'd like to find out all about it,' said Orville.

'You will, Orv! I've already written to Professor Samuel Langley, the head of the Smithsonian Institution in Washington. Professor Langley is also trying to build a flying machine. He has collected all the literature on the subject. I'm sure he'll be willing to send some of it to us.'

Professor Langley was only too glad to help. He sent them a number of books and articles about the latest experiments in human flight, including the almost successful attempts of Lilienthal. The two brothers became absorbed in reading these books and articles. 'Actually,' said Orville 'one or two people have succeeded in *gliding* through the air, but nobody has really succeeded in *flying*. Just like a bird, I mean.'

'I guess you're right,' Wilbur admitted. 'But if we study these books and articles carefully, we may get valuable hints about flying. The scientific principles in both cases are the same, I imagine.'

So they plunged more deeply into the literature about

the scientific attempts at human flight. But just then they were interrupted by another illness in the Wright family. This time it was Orville. He went down with an attack of typhoid.

For a long time he ran a high temperature. The doctors were afraid he might die. In those days there was no inoculation against typhoid, and very often the disease proved to be fatal. For about two weeks Orville was delirious. But finally the fever subsided and he was able to sit up. 'Anything new while I was ill?' he asked.

Wilbur looked questioningly at the doctor, who happened to be present at the time. The doctor nodded. 'It's all right,' he said. 'Go ahead and tell him.'

'We've just read,' said Wilbur, 'that Otto Lilienthal got killed when his glider crashed to the ground.'

For a few moments Orville was silent. He not only pitied the victim of the crash, but he felt that another dream about human flight had collapsed. Finally he spoke with a wan smile on his lips: 'It looks as if it's up to us to carry on.'

When Orville grew stronger, the two brothers continued to discuss the possibility of flight and the part they might play in its development. They read about another man who had experimented with gliders. This man was Octave Chanute. After a few attempts, Chanute had given up. But he had learned a great deal about the principles of flying—the physical laws that keep objects suspended in the air—and he had written a book about them.

The boys spent many an hour discussing this book. It seemed to contain more valuable information than most of the other literature on the subject. The whole secret, apparently, lay in the proper balancing of the wings. Chanute had depended upon shifting his body on the wings of the glider in order to maintain his balance in the wind.

'It looks like a sound idea,' said Orville.

'Yes,' said Wilbur. 'But first we must learn more about the behaviour of the wind.' He picked up a piece of paper, held it with its surface parallel to the ground, and let it fall. 'Look at this paper,' he said. 'It doesn't glide down as a sensible piece of paper should. Instead, it wiggles around, and shoots up and down, and swerves from right to left, and behaves on the whole like a bucking bronco. It's our business, Orv, to tame this refractory horse.'

'There are only two ways,' observed Orville, 'in which we can do this. By watching the birds and studying the winds.'

They began to spend more and more time on these two studies. One day a friend visited their shop while they were working on a bicycle. Suddenly they dropped their work and dashed to the window.

'Where's the fire?' asked the friend.

'No fire,' said Orville, 'just a flock of wild ducks flying by.'

The friend touched his head. 'Poor boys,' he murmured to himself, 'they're not all there.'

This was the general verdict when their friends saw them trudging towards the fields in a storm when everybody else was hurrying home. 'Where are you going?' they asked.

'To see the wind.'

Crazy! thought their friends as they redoubled their own speed away from the storm.

As a result of their study of wings and winds, the Wright brothers built a biplane kite that measured five feet in length and over a foot in width. It had a contraption of cords tied to the various parts of the machine just as the strings in a marionette show are tied to the hands, feet and heads of the dummy performers. One of the brothers held the strings in his hands as the kite flew in the air, while the other took notes. The kite was an improvement over most of the others at the time, yet it failed to satisfy the

two young inventors. They began to have their moments of despondency. They were devoting a great deal of their time—much more than they could afford—to their experiments. Perhaps they were aiming at an impossible goal after all? Perhaps human flight was nothing more than a dream? Ed Sines advised them to put a stop to their ‘childish’ play. ‘Don’t forget,’ he said, ‘we’ve got a business to attend to.’

‘But this is part of my very life,’ said Orville stubbornly.

‘Mine, too,’ echoed Wilbur.

Ed Sines was persistent. ‘It may be the *end* of your life. Remember the death of Lilienthal.’

Wilbur and Orville made no reply to these words. They were thinking hard. Ed Sines pressed his point. ‘Besides, history has proved that the chances are all against you. Haven’t you told me that Sir Hiram Maxim, one of the greatest inventors in the world, spent over a hundred thousand dollars on airplanes that couldn’t work, and then had to give it all up as a hopeless job?’

Again no reply from the brothers, and Ed went on with his effort to put the ‘crazy’ idea out of their heads. ‘You know you haven’t got anywhere near that amount of money to waste. So why not give up these juvenile toys and attend to grown-up things?’

At last Wilbur was ready to give an emphatic answer. ‘All you say, Ed, may be quite true. But I just don’t know how to give up.’

‘I don’t either,’ said Orville.

CHAPTER VII

READY FOR THEIR FIRST FLIGHT

THE Wrights watched the birds not only as they sailed through the air, but as they took off from the ground. 'Have you noticed,' asked Orville, 'how the birds rarely rise straight into the air, but get a running start before they can lift themselves from the earth?'

'Yes,' said Orville. 'I've noticed that. And I've also noticed how they change their style when they fly in different kinds of air currents. The other day, for instance, I saw a buzzard flying around in circles and flapping his wings when there was a sudden whirlwind in the air. And then when the wind began to blow in a single direction, the buzzard just settled down upon it and hardly moved his wings as he allowed the wind to carry him from the top down to the bottom of a hill.'

'That's how we'll have to do our own flying,' said Orville. 'First we must get a running start, and then we must fly according to the currents of the wind.'

But they had learned from their reading that the wind currents can be very treacherous; not at all like the currents of a smooth-flowing river, but rather more like the rapids and the whirlpools that foam around a cataract. Every house, every tree, every hilltop, sends up spirals of wind that blow into the air and change the direction of the gusts they encounter on the way.

'The thing for us to do,' said Wilbur, 'is to find out just how the competing winds blow.'

'It's like finding out how a skittish horse behaves,' observed Orville.

Wilbur nodded. 'There are two ways to do this. One

way is to sit on the fence and watch the horse as he performs his crazy antics. And then you go home and try to figure out how you can best control his sudden jumps and kicks. The other way is to get on the horse and learn how to handle him from actual experience.'

'Our best bet,' said Orville, 'is to try both ways. It's the scientific method—theory and practice.'

This is the method they adopted in their efforts to solve the mystery of flight. They watched the winds and they wrote to the Weather Bureau in Washington for information about the velocities and the directions of the air currents in different parts of the country. And they began to build a man-carrying kite which would help them to turn their theoretical knowledge into practical experience.

At this point they were able to enlist the interest of the French inventor Octave Chanute, who was now living in Chicago. They sent a letter to Chanute informing him that they were trying to make a 'passenger kite', and asking him to suggest a place where the winds would be most favourable for trying it out. He mentioned San Diego, California, and Pine Island, Florida, as possible 'flying fields' because of the steady sea breezes that blew at those two spots. 'However,' he continued, 'There are no sand hills here; and you need a barren hill from which to take off. Perhaps therefore, you, might find a better place on the Atlantic coast of Carolina or Georgia.'

At about the same time they received a bulletin from the Washington Weather Bureau informing them of a likely place for a try-out. This was situated on the North Carolina coast, and had a peculiar name—*Kitty Hawk*.

'I like it,' said Orville. 'It sounds like the name of a bird. Let's find out something more about it.'

Wilbur wrote to the chief of the Weather Bureau at Kitty Hawk, asking him for detailed information about the place. 'My brother and I,' he explained, 'are interested in conducting experiments with a man-carrying kite.

Would it be possible for the two of us to obtain board and lodging in the neighbourhood until we establish a camp on the spot?'

The request came as a great surprise to Joseph J. Doshier, who was in charge of the weather station at Kitty Hawk. This Wilbur Wright, he thought, must be a lunatic. Yet the letter sounded sane enough. Mr. Doshier decided to answer—politely but briefly. He told Wilbur about the general nature of the land and the prevailing winds, and informed him that he would ask a neighbour of his, William J. Tate, to give the Wrights further details about Kitty Hawk.

'Bill' Tate, one of the best educated men in the vicinity, was more enthusiastic than Joe Doshier. He had read something about the historic attempts at aviation, and he had an open mind on the subject. He was anxious to welcome the Wright brothers and watch their experiments. 'I am the postmaster at Kitty Hawk,' he wrote on August 18th, 1900. 'This place is ideal for your purpose. We have here a number of sand dunes, wide stretches of land without any trees, and prevailing high winds that blow in from the ocean. As for putting you up, I am sure we could make arrangements for as long as you like.'

This letter convinced the Wrights that Kitty Hawk was the place they were looking for. They sent another letter to Mr. Tate informing him that they would arrive as soon as they could finish their glider.

Now that the summer was almost at an end, there was a lull in the bicycle business. The Wrights had plenty of leisure to work on their flying machine. In the course of their work, they had a number of arguments about the construction of the various parts in the glider.

'The way to keep the glider from tipping over,' said Orville, 'is to make the wings pointed, like a bird's.'

'No,' objected Wilbur, 'the pointed wings would throw the machine off balance. I'd suggest oblong wings.'

'I don't know. They'd make the thing look too much like a flying crate.'

'So what? As long as it could fly?'

'Well, maybe. But I think we ought to round off the corners, so they'll catch the wind more easily.'

'How much rounding would you suggest?' asked Wilbur.

'I don't know. You're the architect, Will. Suppose you figure it out.'

'All right, Orv. I'll figure it out and make a blueprint.'

'And when you do, don't forget the elevator.'

'Elevator?'

'I mean the rudder that will steer the glider up or down in the air.'

'And what about the rudder that will steer it to the left or the right?'

'Then draw two rudders, a vertical and a horizontal one.'

'Good idea. I'll try to figure that out, too.'

Wilbur worked hard on the blueprint. There were a great many details to straighten out in his mind before he could put them down on paper. One of the details that gave him particular trouble was this: should the wings be straight or curved? One day, as he sat in his shop, he noticed an empty cardboard box on the floor. It had contained a bicycle tyre that he had just sold to a customer. He picked up the box and began to twist it idly between his fingers. He bent one of the right-hand corners up, and one of the left-hand corners down. Then he repeated the alternate warpings with some of the other corners. Suddenly he jumped up from his seat. 'I've got it!' he cried. He would draw a glider with a warped surface, so that the wings would catch the various pressures of the wind at the right times and in the right places.

The idea was still vague in his mind as he began to sketch a formula for warping the wings of the glider. It was this idea, resulting from Wilbur's observation of a twisted

cardboard box, that marked the first great step in the solution of the mystery of human flight.

When the blueprint was finished, it took the Wrights only a few weeks to build the glider. And the cost of this glider was just a little over \$15.

The brothers were now ready for their first trial flights at Kitty Hawk.

CHAPTER VIII

IT FLIES!

THEY were ready to take their glider to Kitty Hawk in the early part of October 1900. Wilbur was thirty-three years old at that time, and Orville was twenty-nine. They had about \$5,000 in the bank, and they were prepared to spend every cent of it on their flying experiments. 'A wild-goose chase', said Ed Sines and the few others who knew anything about their plans.

It appeared indeed like a wild-goose chase when the brothers arrived at Kitty Hawk after a long and exhausting journey. First they had taken a train to Norfolk, Virginia. Then they travelled in another train across a stretch of land called the Dismal Swamp to Elizabeth City. There they boarded a rickety old oyster boat that limped and chugged its way across the Albemarle Sound to Roanoke Island, the scene of Sir Walter Raleigh's 'Lost Colony'. Although the distance was only a few miles, it took the boat two days of battling against the winds and the tides before it reached its destination. 'Thank the Lord we're safe,' growled the captain, an old tar who looked as rickety as his craft. 'I never thought we'd make it.'

But this wasn't the end of the journey. Not yet. At Roanoke Island, they boarded another boat that took them to a place called Nag's Head. Then came a four-mile tramp over a tangle of woods and marshes, and at last 'we found ourselves lost'—as Wilbur expressed it—at Kitty Hawk. 'This place,' said Orville, 'looks like the end of the world.'

They asked a little boy to show them the way to the home of William Tate. There they found a hearty wel-

come, a hot meal—the first they had eaten for several days—and a soft bed in which they enjoyed a good sleep.

The next morning they went out to inspect the scene of their adventure. The spot was called Kill Devil Hill—‘A very appropriate name’, Wilbur observed with a wry smile.

‘Let’s hope it won’t kill *us*,’ laughed Orville.

‘Perish the thought!’ exclaimed Wilbur.

They made arrangements to stay at the Tate home until they were able to establish a camp at Kill Devil Hill. And then they wrote to their father to send them the glider which they had taken apart and crated before they left Dayton.

When the glider arrived, they put the framework together again, sewed a covering of French sateen over it, and then set up a camp for their operations.

The camp was a tent twelve feet wide and twenty-two feet long. One end was anchored to a tree—the only bit of vegetation in the wide stretch of swamp and sand. A mocking-bird had built a nest in the tree; and sometimes when Orville sang and Wilbur accompanied him on a mandolin he had brought with him from Dayton, the bird joined them in their song. ‘Quite a happy family’, said Tate, who had come to visit them during one of their concerts.

However, the Wrights had but little time for play. There was too much hard work to be done. They had to carry water more than a thousand feet over the dunes. Orville did the cooking, and Wilbur attended to the washing-up. And both of them worked together on assembling the machine.

At last the glider was ready for the first test. In many respects it was similar to those built by Lilienthal, Chanute, and other early experimenters in aviation. But it had several important differences. The warping of the wings



and their 'cutting edges' were more scientifically constructed to meet the various changes in the wind currents. The wires connecting the different parts of the machine were arranged in such a way that they could all be tightened by merely pulling two of them together. And—what seemed to the Wrights most important of all—an arrangement was made for the operator to *lie down* instead of *sitting up* on the lower wing. They had learned this trick as children—to *ride under the wind*.

As the sun set on the day before their first flight, the brothers were too nervous either to sing or play. Again and again they walked round the glider, examining every bit of it to see that everything was in good shape. They tightened the nuts, fastened the wires, examined the warping of the wings, looked at the tables of air pressure, and checked on the weather forecasts for the following day.

Just before they retired for the night, Wilbur turned to Orville. 'Do you think it will work?'

'We'll know soon enough,' said Orville. 'At any rate, it seems the wind will be right. It's blowing about twenty

miles an hour just now. The forecast is about the same for tomorrow.'

'Well, good night, Orv.'

'Good night, Will.'

The next morning they got up with the sun. The wind was blowing rather too briskly for a successful test—about thirty miles an hour.

'Perhaps it will slow down later in the day,' said Wilbur.

The wind did slow down a bit, and the brothers were ready for the test. 'Who'll be the first rider?' asked Orville.

'Let's toss a coin.'

Orville won the toss. The brothers took the glider to the top of Kill Devil Hill, and Orville lay down flat on the lower wing. He took the controls, as Wilbur turned the machine to point directly into the wind. 'I'm ready now!' His voice was quiet, but the thumping of his heart was like the beating of a drum.

Wilbur loosened the ropes that held the glider fastened to the ground. 'Here goes, Orv, and good luck!'

Orville pulled the elevator, or up-and-down rudder, to lift the machine off the ground. And the big kite, with its first human passenger, responded to the pull! It rose slowly into the air, dipped sharply to the right but immediately straightened out as Orville pulled the wing-warping lever, and then flew off across the dunes!

It was a flight of only a few seconds, and about a dozen feet above the ground. *But the machine had carried a man into the air.*

'Well, we've done it!' cried Orville as he landed safely on the soft sand. 'Tomorrow it's *your* turn, Will.'

The next day Will stayed up in the air a little longer. And then they took turns, one of them guiding the machine in the air, and the other taking notes on the ground. In this way they learned many facts about the behaviour of gliders in the wind. When the wind was right, they could average about twelve miles an hour—though the actual

time they stayed in the air during any one flight was about ten seconds. Yet even in those few seconds they had the greatest difficulty in keeping the glider on an even keel. With all their skill in handling the wing-warpings and the rudders, they found it almost impossible to 'buck the wind' without crashing to the ground. Indeed, they had a few minor crashes which, fortunately, resulted in no serious injury to either of them.

In one of the crashes, however, the glider was completely ruined. 'Oh well,' said Wilbur as he looked at the wreckage, 'its about time to quit for the present. The climate hereabouts is too cold and windy at this time of the year.'

'Yes,' said Orville. 'Another year, another plane, and better luck next time!'

They dismantled their glider and gave the sateen covering to Mrs. Tate. 'Perhaps you can use it for something.'

'Yes, indeed,' she replied. 'I'll make dresses out of this material for my two little girls.'

She made them after the brothers had returned to Dayton. When the children appeared in their fine dresses, the people of Kitty Hawk shook their heads. 'To think,' said one of them, 'that the lunatics wasted this beautiful material on a kite!'

CHAPTER IX

THE WIND TUNNEL

ALTOGETHER the brothers had spent only two minutes in the air—over a series of twelve flights. Yet they were not disappointed at the results. On the contrary, they felt encouraged to go on. ‘The thing for us to do,’ said Orville, ‘is to examine our mistakes, correct them, and try again.’

‘And again,’ nodded Wilbur.

So they started to build a bigger and sturdier machine and to prepare for their next year’s experiments at Kitty Hawk.

This time they planned to go to Kitty Hawk in July instead of October. And at the suggestion of Chanute, they took with them a third man—Dr. George A. Spratt—‘in case you get any broken bones’, as Chanute expressed it.

Dr. Spratt, an ‘amateur’ in aviation, had made a study of the experiments conducted by Lilienthal, Chanute and others. The Wrights were eager to talk to him about his investigations, and he was equally eager to see the Wrights in action.

When they arrived at Kitty Hawk, in the middle of July 1901, they were joined by a fourth man, an engineer by the name E. C. Huffaker. This man, too, came at the recommendation of Octave Chanute.

The four men camped together and discussed the plans for the improvement of the new glider. This new machine was almost twice as big as the old one. They had built a wooden shed to house it, while they themselves lived in a tent. They got their water supply by driving a pipe about twelve feet long into the sand.

It was on July 27th that Wilbur took off on his first

flight in the new glider. The machine stayed up in the air for 19 seconds and covered a distance of 315 feet. The spectators applauded the feat, but the Wrights were not at all satisfied. They made several other attempts, and the results were still unsatisfactory. The machine dipped too much on one side or the other, the elevator at times failed to elevate, and the behaviour of the plane on the whole was even less effective than that of the earlier glider.

'The trouble with this machine,' suggested Dr. Spratt, 'is that it's too big. A monster of this size is too unwieldy for human control.'

But Wilbur shook his head. 'It isn't the size that is at fault,' he said, 'but our theory. What we need is further study of the winds and their action upon the glider's wings.'

This view received the support of Octave Chanute, who had come to visit the Wrights early in August. 'You are on the right track, boys,' he said. 'What you need to do is to work out an accurate table of wind velocities and wing-warpings. With such a table on hand, you should be able to manage a bigger as well as a smaller plane.'

Chanute's words inspired the Wright brothers to even greater effort. He had done so much work in the field of aeronautics that they regarded him as their teacher. It was very comforting to know that he believed they were on the right track. All they needed was more time and further study and tests.

So they went ahead with greater determination than ever before. They continued their flights, daring the winds and barely escaping one or two fatal crashes, learning to temper their wings to the air currents and staying up for longer and longer periods from flight to flight.

Chanute watched them carefully and took pictures of their plane as it glided through the air. These were the first photographs in the history of aviation.

Yet the two brothers were far from elated over their

success. At times they were downright despondent. They realized that their machine was still a clumsy contraption and that at best they were amateurish imitators of the soaring birds. 'The experiments of 1901,' wrote Wilbur later, 'were far from encouraging. Although Mr. Chanute assured us that our results were better than any that had gone before, we saw that the calculations upon which all flying machines had been based were unreliable and that all of us had been simply groping in the dark.'

So he talked the matter over with Orville and Chanute. 'Perhaps we are wasting our time after all,' he said. 'I've just about come to the conclusion that man will not fly for a thousand years.'

'I don't blame you for being discouraged at times,' said Chanute. 'I imagine even Columbus had such moments. But remember his motto—*Sail on and on.*'

'But Columbus,' objected Wilbur, 'had a purpose when he sailed into the unknown. Orv and I are different. To us, flying is just a sport.'

'You're wrong there,' said Mr. Chanute quietly. 'You, too, have a purpose. I believe you're going to revolutionize our methods of travel and our very way of life.'

'I've never thought of it that way,' Orville broke in. 'I always thought we were flying just for the fun of it. But now you make me see it in a new light.'

'I think I, too, begin to see it,' nodded Wilbur.

'I knew you would,' said Chanute. 'You two are the leading pioneers in air travel. You have already advanced beyond all the rest of us. You owe it to the world to go on and on!'

The brothers took these words to heart. 'You owe it to the world.' What had started as a sport had now become a mission. They simply *had* to go on. 'It was with reluctance that we plunged into the scientific side of aeronautics,' declared Wilbur. 'But we soon found the work so fascinating that we were drawn into it deeper and deeper.'

Their first step was to invent an instrument for a more accurate study of the wind. 'The standard measurement of wind pressures at the present time,' explained Wilbur, 'is the force produced by a current of air of one mile an hour's velocity striking squarely against a plane of one square foot in area.' But different authorities arrived at different figures. The reason for these variations—amounting at times to as much as 50 per cent—was due to the imperfect measuring instruments then in use. 'These imperfect instruments could well lead to disaster in flying experiments.' Indeed, they had led to the death of Lilienthal.

So the brothers proceeded to construct a new device for measuring the wind. They neglected their bicycle business and cleared a space in their shop for what they called a 'wind tunnel'. This tunnel was a simple machine consisting of a square tube sixteen inches on each side and six feet long. At one end of the machine they placed a motor that could be adjusted to turn a fan at various speeds. The other end of the machine was open for the passage of the wind generated by the fan.

The visitors at the shop laughed when they saw this contraption. They thought the two 'wind-chasers' were insane to give up a solid bicycle business for the empty pleasure of tinkering with the air. 'How are you going to make a living?' asked one of them.

'We've saved up enough money to keep us going for a while,' said Orville.

'And when your money gives out, will you eat the wind?'

'When our money gives out, we'll make some more bicycles.'

The visitor shrugged his shoulders and walked out. 'Crazy as a couple of lunatics,' he muttered to himself as the brothers returned to their wind tunnel.

It was in the open mouth of the wind tunnel that the brothers discovered the final secret of aviation. Through-

out the winter of 1901-2 they studied the air currents produced by the fan blowing at various speeds. Up to that point they had merely observed the sustaining power of the wind as it reacted upon bits of paper falling through the air. But now they were able to take precise measurements of the wind as it blew at different speeds upon all kinds of material in all sorts of shapes.

They started with over two hundred small sheets of paper and cardboard. Then they proceeded to cut up thin sheets of metal and to twist them into various curves and angles. As they watched the behaviour of all these objects in the wind tunnel, they took thousands of notes. And little by little they discovered a number of definite facts.

Some of these facts proved of the utmost importance. For example, they learned that a plane whose length was six times its width could fly better than another plane of the same area whose length was only three times its width. The discovery of this fact explained why the Wrights had not been able to get better results with their two planes at Kitty Hawk. They had built those planes with a three-to-one instead of six-to-one ratio.

Slowly and patiently the brothers examined their newly-discovered facts, checked and rechecked them, related them to one another, and were finally prepared to build a new plane upon an entirely new principle—a scientific principle that promised to be correct. It now remained for them to put the plane together and try it out.

They were ready for this new trial in the autumn of 1902. Again they selected the sand-hills of Kitty Hawk as the scene of their experiment. This time, they hoped, they would no longer 'fly in the dark' as in the past. Their new plane had the right proportions and the right wing curvatures to meet every challenge of the capricious wind.

The only thing the plane lacked was a motor. 'But,' as Orville explained, 'let's do one thing at a time. First let us try a good glider without a motor. And then, if we suc-

ceed, we shall try a motor-propelled plane. After we have learned to *glide* safely, we can learn to *fly*.'

They were ready for the new tests at Kitty Hawk on September 19th, 1902. Their plane was built upon the six-to-one ratio—it was six times as long as it was wide. Its wings were curved according to the principles they had discovered in their wind tunnel experiments. And it had one added feature—a tail which served as a rudder for the better balancing and steering of the machine.

The new machine worked even better than they had expected. All in all it made over a thousand glides. Some of those glides averaged more than six hundred feet. The machine sailed in a wind of thirty-six miles an hour as safely as in a breeze of fourteen miles an hour. At times it stayed in the air for thirty seconds—a feat that amazed even the Wrights themselves.

It was at the end of one of these 'amazing' flights that Dan Tate, the brother of Bill Tate, exclaimed: 'All the machine needs is a coat of feathers, and by golly, I think she'd fly like a sea-gull!'

Yet even now the brothers were not altogether satisfied. Every once in a while the machine didn't behave quite right. It had a way of dipping to one side, so that the end of the wing struck the sand with a whirring motion. The brothers called this motion 'well-digging'.

This sort of accident was something new. It had never happened in their earlier gliders. They came to the conclusion that the fault was due to the tail (such accidents are now known as 'tail-spins'), but for a time they didn't understand just *why* the tail behaved in that freakish manner.

Then one night, as Orville lay awake for several hours, he hit upon the reason. The next morning he talked it over with Wilbur; and then the two explained it in non-technical terms to their brother Lorin who was visiting them at the time. 'It is all a matter of control and co-

ordination,' said Orville. 'It sounds more complicated than it really is. What we've got to do is get the two wings and the tail to work together.'

'And to do it,' added Wilbur, 'we must control all three of them with a single set of wires.'

'Just as a bird controls its wings and tail with a single set of nerves?' asked Lorin.

'Precisely,' agreed Orville. 'The trouble with our glider at present is that we have a double instead of a single control. One set of wires takes care of the wings, and another set takes care of the tail.'

'I see what you mean,' said Lorin. 'If you have a single control, you will have better co-ordination. The wings and the tail will work together instead of separately, and the glider will then be more likely to stay on an even keel.'

So the brothers re-adjusted the wires and put an end to the dangerous 'well-digging' of their glider.

They had now finished their preliminary studies of wind currents and glider controls. Their next step was to replace their glider with a flier—a machine with a motor that would send it sailing through the air as a ship sails over the ocean.

They returned to Dayton and set to work building their new power plane while their neighbours still looked on and laughed.

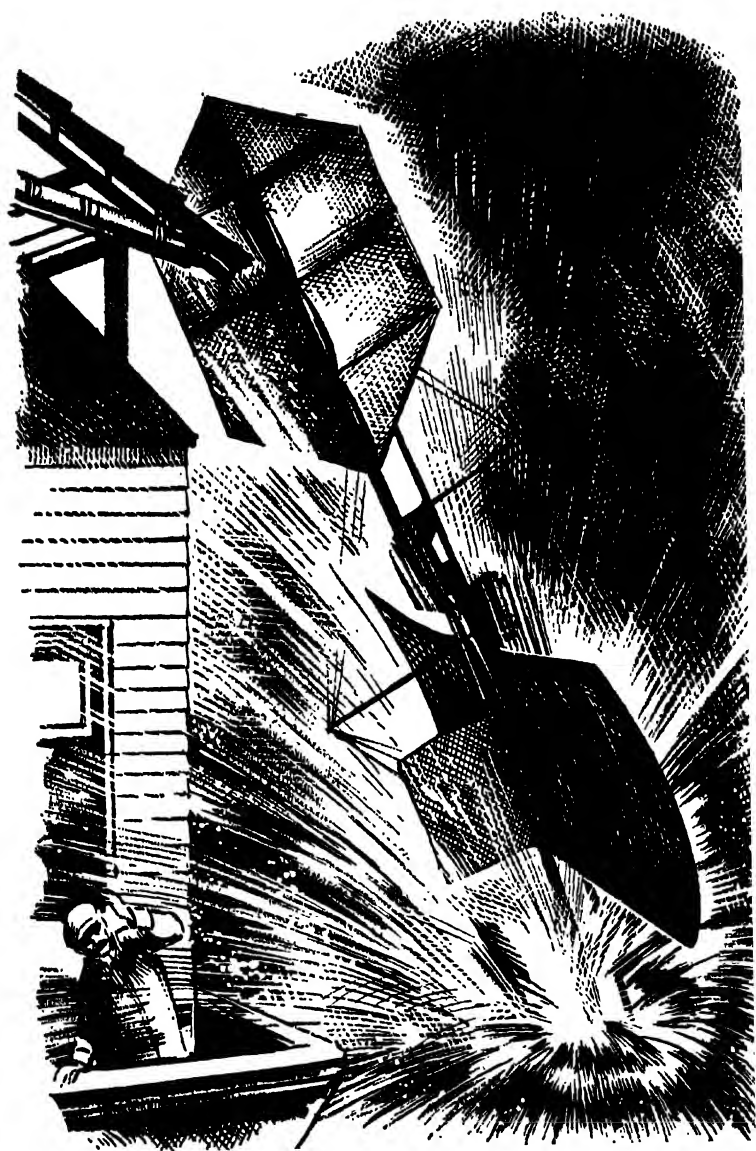
CHAPTER X

'MEN WILL NEVER FLY...'

THEIR neighbours were not the only ones who ridiculed the experiments of the Wright brothers. Some of the world's leading scientists declared that it would be impossible for heavier-than-air machines to fly. One of these scientists, Professor Simon Newcomb, wrote a number of magazine articles in which he stated positively that the idea of human flight was nonsense. Even if a man were able to start, argued Professor Newcomb, he wouldn't be able to stop. 'Once he stops, he falls a dead mass. How can he reach the ground without destroying his machine and himself?'

These articles made a profound impression on the public. 'Men will never fly,' people kept saying to one another. The public distrust in the possibility of flight became even greater when another 'crazy' experimenter made an attempt in a power plane and failed. This man, Professor Samuel P. Langley, had received \$50,000 from the United States Government for the building of 'a plane capable of carrying a man'.

Together with an assistant, Charles M. Manly, Professor Langley had built this plane, and Mr. Manly was ready for his trial flight on October 7th, 1903. The scene of the attempted flight was Widewater, Virginia, a point on the Potomac about thirty miles south of Washington. For the launching of the plane they had constructed a 'huge, ark-like houseboat' with a track on the roof. At one end of the track they had placed a launching apparatus—a 'catapult car' with coiled steel springs all set to 'hurl the airplane into the air'.



Altogether this professional attempt was far better financed and more widely advertised than the amateur efforts of the two obscure bicycle mechanics in Ohio. Yet it failed. Here is how the *Washington Post* described it:

Shortly after twelve o'clock Mr. Manly, wearing a pair of light trousers, canvas shoes, a life preserver, and a pair of automobile glasses, climbed into the car. Two tugs were stationed out in the river at a distance from the ark. When all was ready, Mr. Manly nodded his head to a helper who fired a skyrocket as a warning to photographers on the Virginia beach to be on the *qui vive*.

A few yards from the houseboat were the boats of the reporters, who waved their hands to Mr. Manly and wished him good luck. He looked down and smiled. The propeller wheels, a foot from his head, whirled around him a thousand times a minute. A man fired two skyrockets into the air (as a signal for the start). There came an answering 'toot-toot' from the tugs.

A mechanic stooped, cut the cable holding the catapult in leash; there was a roaring, grinding noise and the Langley airship tumbled over the edge of the houseboat and disappeared into the river, sixty feet below. It simply slid into the water like a handful of mortar.

Professor Langley and Mr. Manly pulled the plane out of the river, patched it up and two months later made another attempt to fly it.

Again it failed, plunging into the water 'like a heavy brickbat', to quote a witness.

The sceptics were elated. 'It is now proved beyond a doubt that men will never fly.'

Shortly after his two failures Professor Langley died; 'laughed to death', as a reporter expressed it.

The Wright brothers heard about these failures, and

they read Professor Newcomb's articles in which he said that anybody who expected to make a successful flight was crazy. 'To be sure, a man can *glide* for a few seconds. But fly?—never!'

Even the successful glides of the Wright Brothers received practically no publicity. About the only one who took any notice of them, curiously enough, was a Sunday School teacher, A. I. Root. Talking to his class about the miracles of the Bible, Mr. Root said, 'I have just heard of a modern miracle. Two young men from Ohio have proved that human flight is possible.' And then he added: 'Some day, perhaps, we may be able to fly over the North Pole.'

But thus far, the rest of the world heard very little about the experiments of the Wright brothers. And those who heard about them dismissed the idea of human flight as the 'silly dream of unbalanced minds'. What was the world coming to, they asked, when people expected to travel through the air in horseless planes? The invention of an aeroplane, they declared, was even crazier than the invention of a horseless carriage which a man by the name of Henry Ford was trying to foist upon the public.

Such was the atmosphere of ridicule and disbelief in which the Wright brothers proceeded to build their first motor-powered plane.

The Wright plane, unlike the Langley machine, was designed to start without the help of a catapult. 'It is going to lift itself into the air by its own bootstraps,' explained Wilbur to Ed Sines.

'And,' added Orville, 'it will stay in the air as long as we like.'

'How can you be so sure?' asked Sines.

'We've got it all worked out. Our gliders came down because the sustaining wind power gave out. But with a motor to keep it going, we don't have to depend upon the power of the wind.'

'I only hope you're right,' said Ed, but there was no conviction in his voice.

'I *know* we're right!' retorted Wilbur. 'We're building the wings, rudders, wires and tail in exact proportion and perfect co-ordination with one another. The plane will be as balanced as a bird. It will fit into the air.'

'Our big remaining problem,' concluded Orville, 'is to get the right motor.'

This was indeed a problem. The brothers wrote to several manufacturers asking them to build the motor for them. But nobody wanted to bother with such a 'useless' job. So Wilbur and Orville decided to build the motor for themselves. This had always been their method. Whenever they needed anything they couldn't buy, they made it themselves.

They cleared a space in the laboratory and began to work on a motor that would sustain a machine and driver weighing altogether about 750 pounds. They prepared the cylinders, valves, pistons and ignition parts and assembled them on the ground. It was new work to them, but they went at it with scientific precision and an indomitable will.

At the end of two months the motor was ready for a ground test. It worked! The only thing the plane now needed for its first flight was the building of the propeller. This, they thought, would be a comparatively easy job. A propeller, they argued, is a wing that flies in a circle instead of in a straight line. The action of the wind, therefore, would be the same on a circular propeller as on a straight wing. They had prepared many sheets of figures showing just how the air currents behaved in their wind tunnel. So all they had to do, they believed, was to base the construction of the propeller upon those figures.

But when they began to discuss the figures, they found that the job was much more complicated than they had

thought. ‘The wind will *not* behave in a circle exactly as it behaves in a straight line,’ argued Wilbur.

‘Why not?’ asked Orville.

This led to a series of arguments that lasted for several months. ‘Frequently after an hour of heated discussion,’ Orville reported, ‘we would discover that we were as far from agreement as when we started, but that *each of us had changed to the other’s original position.*’

In addition to their arguments, they read all the books they could get on the action of propellers in the water. ‘But,’ as Orville pointed out, ‘the water and the air are two distinct elements, and their behaviour on sailing objects is entirely different.’ They found little to help them in the books on water propellers.

‘We’ll have to forget all we’ve read on the subject,’ said Wilbur, ‘and work it out on our own.’

At last Wilbur agreed. ‘Yes, Orv, let’s stop arguing and get to work.’

But still they didn’t know just where to begin. As Orville later explained: ‘With the machine moving forward, the air flying backward, the propellers turning side-wise and nothing standing still, it seemed impossible to find a starting point from which to trace the various simultaneous actions. The very thought of it was enough to set our heads whirling the way we wanted our propellers to whirl!’

But gradually, using the scientific method of trial and error, they arrived at success over the road of failure. They built a propeller and, just as in the case of their motor, they used the shop instead of the plane as a testing ground.

Again it worked! The problem of the circular wing, like all the other problems connected with their first motor plane, had been solved. They were now ready for their first *real* flight.

They crated their machine, shipped it to Kitty Hawk

and set out for their exciting test. They looked like a couple of athletes about to engage in a game which they confidently expected to win. They knew their machine was correct, and physically they felt in perfect trim. Wilbur, thirty-six years old, had a tough and wiry frame almost six feet tall. Orville, thirty-two, was a little shorter and stockier. Both had grey-blue eyes that could melt with tenderness, sparkle with humour, and glitter with a will to fight against odds.

And plenty of odds awaited them when they arrived at Kill Devil Hill. A storm had almost completely destroyed their camp. They repaired the shed and built another one next to it. They now had enough room to house their old glider as well as their new power machine.

But no sooner had they got the camp into shape than one of the worst hurricanes for years descended upon Kitty Hawk. With the wind blowing close to a hundred miles an hour, Orville climbed on to the roof of the new shed and tried to nail down some of the wooden tiles that had come loose. The wind whipped his coat about him and pinioned his arms. He was in danger of flying into the air at any moment—and without his machine! Wilbur rushed to his assistance and managed to rescue his brother before both of them were blown away.

It took almost a month to repair the new damage to the camp. And then, just as they were ready for their flight test, one of the propeller shafts tore loose and had to be sent back to Dayton for repairs.

It was now getting uncomfortably close to the winter of 1903. Dr. Spratt and Octave Chanute had come to witness their flight, but the icy weather drove them away. 'Why don't you return home and wait till next spring?' suggested Mr. Tate.

'You're welcome to stay with us over the winter,' said Mrs. Tate.

'Of course you are,' nodded her husband. 'But if I were

you I wouldn't attempt any flights at this time of the year. Even the birds,' he added with a chuckle, 'are abandoning Kitty Hawk.'

But the brothers were stubborn. 'It is now or never,' said Wilbur.

'Our purpose,' added Orville, 'is to develop a machine that can fly in all kinds of weather.'

When they were ready for their first flight, it began to snow. The snow turned into sleet, and then into rain. This unfavourable weather lasted for several days. It was getting close to Christmas, and the brothers were anxious to be home by then.

At last, on Monday, December 14th the weather cleared up. Wilbur raised a flag on top of one of the sheds at Kill Devil Hill as a signal for the nearby settlers who might want to see the first flight. Just a handful of people arrived in answer to the signal.

The two brothers tossed a coin to determine which of them was to make the test. Wilbur won the toss. With his heart beating a rapid tattoo, he climbed into the plane and stretched himself face down on the lower wing. With his right hand he gripped the elevator lever as Orville started the motor.

'All ready? Let go!'

The machine started so fast that Orville who was running alongside was left far behind.

A cheer went up from the spectators. But the next moment it changed to a gasp. The machine had risen almost straight into the air and then suddenly turned down towards the ground. In his great anxiety Wilbur had nosed the plane upwards at too steep an angle. And then turning the lever down again, he had made a nose dive about a hundred feet from the take-off.

And thus the first flight of the motor plane ended in near disaster. Though Wilbur escaped without a scratch, one of the wings of the plane was badly damaged.

'Just as I thought,' muttered one of the spectators. 'First the Langley plane, and now the Wright plane.'

'Yes,' nodded another spectator. 'Don't reckon nobody'll ever build a machine that can fly.'

But Wilbur, who had overheard the conversation, disagreed. 'It wasn't the machine's fault, but my own. We'll know better next time, I hope.'

CHAPTER XI

THE NEWS THAT NOBODY BELIEVED

THE next time it was Orville's turn. It had taken them only two days to repair the wing; and on December 16th, Orville was ready for the test.

It was late in the afternoon when they completed the work on the machine. A stranger who witnessed the proceedings turned to Wilbur. 'Might I ask what this thing is?'

'A flying machine,' said Wilbur.

'Is it actually going to fly?'

'Yes, as soon as we get a suitable wind.'

For a few moments the stranger made no reply. And then, trying to conceal his contempt, he said, 'Oh yes, I understand—a suitable wind.' Under his breath he added, 'I guess he means a hurricane.'

It was getting dark now, so they postponed the test till the next day. When they awoke on the morning of December 17th, a cold wind was blowing at a brisk 25 miles an hour. The puddles of water left by the recent rains had frozen during the night. 'Perhaps we had better wait till it gets warmer and the wind dies down a little,' suggested Wilbur.

'No,' insisted Orville. 'The machine is ready, and I am ready. So let's get going.'

Wilbur nodded. 'I guess you're right, Orv. A strong wind means a harder and more dangerous flight, but it also means a slower and safer landing. That is, if you face the machine *into* the wind.'

'This is precisely what I intend to do, Will—face the machine into the wind.'

They raised their flag signal; but when the plane was ready for the take-off, only five spectators had arrived at Kill Devil Hill. The cold brisk wind kept everybody else away.

Indeed, it drove the spectators and even the two brothers indoors from time to time. They had to 'unfreeze their fingers' at a warm stove in the middle of the shed.

At half past ten in the morning everything was ready for the daring test. Years later, when Orville wrote about this test, he observed: 'I now look with amazement upon our audacity in attempting a flight with a new and untried machine in a 27-mile wind.'

But at the time of the attempt they felt absolutely safe. They knew that their tables of air pressures were scientifically accurate and that the structure of their plane was mechanically correct. 'All you have to do,' said Wilbur to Orville, 'is to avoid the mistake I made the other day. Don't climb too fast at the take-off.'

'I won't, Will.' He got into the plane, as his brother began to warm up the motor.

'Everything ready?'

'Yes.'

'Well, here goes, and better luck this time!'

The machine rose gracefully into the air and sliced into the wind. 'It flies! It flies!' cried the spectators.

The plane stayed in the air only twelve seconds. The wind was too gusty for any sustained effort. But Orville manoeuvred the machine safely down to the ground. It was the first human flight in the history of the world! Orville had raised the machine under its own power and had landed it under perfect control.

Yet neither of the brothers was unduly excited. The flight was good as far as it went, but it was not good enough. They went into the shed to warm the chill out of their bones and then returned to the airfield for another try.

It was now twenty minutes past eleven. Wilbur took his turn at the controls. He kept the plane in the air for thirteen seconds. 'A trifle better than before,' he remarked as he stepped out, 'but still not good enough.'

Orville took the plane up for a third test at a quarter to twelve. This time it travelled for fifteen seconds and over two hundred feet in the air. 'We're improving,' he said, 'but let's try again.'

Wilbur took off on the fourth flight at noon. A hundred feet of bumpy skittishness, and then several hundred feet of smooth sailing. After covering about a sixth of a mile in the air, Wilbur brought the plane down with a few scratches but without any serious injury.

As they stood near the grounded plane discussing their flights, a strong gust of wind struck the machine and sent it hurtling over and over. Everybody made a rush for it, but it was too late. The machine was completely wrecked. Any further flights for that year were out of the question.

'But,' said Wilbur modestly, 'we have learned that human flight is possible.'

'Not only possible,' corrected Orville, 'but an actual fact.'

Their one regret was that their friend Bill Tate had not been present at their tests. 'Only a crazy man,' he had declared, 'will attempt to fly in such a wind.' His scepticism had caused him to miss the thrill of his life.

As for the two brothers, their first thought was to send a telegram to their father:

SUCCESS FOUR FLIGHTS THURSDAY MORNING STARTED
FROM LEVEL WITH ENGINE POWER ALONE LONGEST FLIGHT
59 SECONDS HOME CHRISTMAS.

They were anxious to keep the news out of the papers until they got home. They wanted the first report of their success to be printed in their home town of Dayton. But

somebody at the Kitty Hawk Weather Bureau wired the news to the telegraph operator at Norfolk, Virginia; and the operator passed it on to H. P. Moore, a reporter on the *Virginian-Pilot*. The next day Mr. Moore printed a garbled story of the flights. He had spun the story mostly out of his imagination. He described a fabulous flight in a fabulous machine by fabulous navigators 'supposed by the natives of Kitty Hawk to be people of means and always well dressed'.

When Orville read the fantastic account in the *Virginian-Pilot*, he said with a chuckle, 'It's an amazing piece of work. Though ninety-nine per cent wrong, it does contain one fact that is correct. There *has* been a flight.'

Mr. Moore sent his story to twenty-one other newspapers. But most of the editors refused to be 'fooled', as they declared. As one of them said: 'God didn't intend man to fly. If He did, He would have given him a set of wings.'

Of the twenty-one editors who received the story, only five ordered it; and of those five, only three printed it the next morning. Even the *Dayton Journal*, the Wrights' home paper, refused to print the story at first. The editor said he had 'more important' news—such as the meeting of a local trade union, the arrest of a pickpocket, the parole of a prisoner and the Christmas shopping of the townspeople.

A few days after Christmas, on January 2nd, 1904, Octave Chanute gave an address on aerial navigation to a group of scientists at St. Louis. In this address he referred to the successful flights of the Wright brothers. But none of the newspapers printed Chanute's statement.

And thus one of the most dramatic events in world history 'fell like a feather upon a silent sea'. Only a few of the more daring editors mentioned it from time to time—and even then, not seriously. They generally printed the news not as a 'fact' but as the 'unproved statement' or

'vague report' of 'somebody or other' who 'was not a witness to the event'.

But Wilbur and Orville cared little for publicity. They were interested in their scientific job and not in their personal glory. They returned to Dayton where they immediately set to work on their next plane. They realized that their success had been only moderate and that they were at the very beginning of human flight. 'I feel,' said Wilbur, 'like a fledgling bird that has just taken its first hop away from the nest. More flights, more experience, and then we'll really begin to navigate through the air.'

'I do believe,' said Orville, 'that in time men will be able to fly at thirty miles an hour.'

Little did he or Wilbur realize that within half a century their invention would enable fliers to approach the speed of the earth's rotation upon its axis—a thousand miles an hour!

CHAPTER XII

FLIERS OR LIARS?

THE European as well as the American editors were sceptical about the reports of a successful flight in a heavier-than-air machine. The *Paris Herald* printed an editorial entitled 'Fliers or Liars'. The writer of the editorial said that the 'Wrights have or have not navigated a plane through the air. They possess a machine or they do not possess one. They are in fact either fliers or liars. It is difficult to fly; it is easy to say, "we have flown".' And therefore, he concluded, 'it is safer to believe that they have *not* flown.'

This, too, was the attitude of practically everybody in the United States. Even their neighbours in Dayton were reluctant to believe in the 'unbelievable'. The owner of the bicycle shop rented by the Wright brothers observed: 'I have known those boys ever since they were small children, and if they say they flew I know they really think so. But they must have been bewitched into imagining things. There is only one power that could lift a machine into the air—spirit power. And I don't believe in spirits.'

The only one who was enthusiastic about the exploit of the two boys was their father, Bishop Wright. It was under his steady encouragement that they set about building their next plane. The bicycle business was now completely neglected. They decided to devote all their time to their interest in aviation. Fortunately they had saved up enough money to meet their modest living expenses. The building of their planes cost them very little, since they did most of the work themselves.

The new plane was ready in the early spring of 1904.

This time they had selected a new field for their tests—a place known as the 'Huffman Prairie'. It belonged to a Dayton bank president and it skirted a railway that ran between Dayton and some of the neighbouring cities.

The land was not very good as a pasture; and when the Wright brothers asked to rent it for their experiments, Mr. Huffman generously allowed them to use it free of charge. 'My one condition,' he said, 'is that you drive my cows to a safe place so that you won't run them over.'

And then he added with a chuckle, 'But you couldn't run them over in the air, could you? That is, if you ever *get* into the air.'

The brothers built a shed at one end of the pasture. Then they sent a letter to each of the Dayton and the Cincinnati papers, informing them that they would make an attempt to fly on May 23rd. 'We shall be pleased to have your reporters present at the time. The only thing we ask is that your announcement should not contain anything sensational.'

They made this last request because they wanted to avoid big crowds of curiosity seekers. But there was no need for them to be worried on that score. Only a few reporters and a handful of neighbours were present at the time they were ready to take off.

The morning was mild and clear. But the wind was blowing at only three miles an hour. 'I'm afraid,' said Wilbur, 'our plane will never get off the ground in this mild breeze. Perhaps we had better wait for a more favourable time.'

'Let us at least try,' urged Orville. 'It wouldn't do to disappoint the people who have come to see us perform.'

'The people,' observed a reporter who overheard them, 'will be disappointed anyhow—whether you try or not.'

Biting his lips at the sarcastic remark, Orville tried to start the motor. But instead of turning over with a smooth purr, it began to splutter and make explosions.

Wilbur looked at Orville with a question in his eyes: 'Hadn't we better stop?'

'No!' snapped Orville. 'We'll go right ahead!' He stepped into the plane, turned the elevator upward, and released the controls.

The machine continued to splutter, ran a few yards on the ground, and came to a full stop. The spectators tittered as Wilbur turned to them and announced: 'No flight today. We'll let you know when we're ready to try again.'

'He needn't bother,' said one of the spectators to another. 'I for one will not be here.'

The other spectator nodded. 'Why waste our time on a couple of crackpots?'

Within a few days the brothers repaired the fault in the engine. But in all their future attempts at flight in 1904 they were practically alone. 'I don't blame them for their disinterest,' wrote Wilbur. 'The performance to which we had treated them convinced them that we weren't worth very much of their time.'

The disinterest of the general public continued even after the brothers had made several successful flights over Huffman Prairie. Now and then the riders on a passing tramcar beheld an amazing spectacle—a huge mechanical bird *flying* and *circling* in the air. For the brothers had now learned to steer their plane at will. On some of their flights they stayed up for several minutes and covered distances of over a mile.

Yet few believed what they saw. They were like the farmer who, on seeing a rhinoceros for the first time, exclaimed: 'It's a lie! There ain't no such creature!'

But the Wrights went courageously on. Flights, successes, failures, injuries—they had their full share of all of them in that memorable year of 1904. On one occasion Orville barely escaped a forty-foot thorn tree. Some of the thorns were several inches long, and hard and sharp as needles. On another occasion the machine suddenly began

to act like a wild horse, bucking up and down and threatening to dismount the rider and break his neck.

In short, the entire year was a period of thrills and spills for the Wright brothers. And all this time they kept improving their plane and perfecting their ability to handle it under all sorts of conditions. But the newspapers still kept silent about the miracle that was unfolding almost before their eyes. Some of the people who had seen the miracle from the tramcars came to the editors of the papers and asked them why nothing was ever said about it in their columns. Some of the editors just ignored the questions; others merely shrugged their shoulders; still others had a ready answer for these 'amateur reporters', as they called them. 'Oh, yes,' they would grunt, 'the old story about the Wrights and their flights.'

Years later one of the Dayton editors, Dan Kumler of the *Daily News*, tried to explain the reason for his scepticism. 'We just didn't believe it,' he said. 'You see, the Wrights at that time kept terribly secret about it.'

'Do you mean to say,' asked his interviewer, 'they could have made a secret of the fact that they were flying over an open field near a big city?'

'I guess,' confessed Mr. Kumler with a grin, 'we were just plain stupid. When people told us they had seen the flights, we thought they had seen them in a dream.'

Towards the end of the year the news of the flights began to trickle through to a number of interested people. One of them was a partner of the famous circus man, P. T. Barnum. 'We have a proposition that will bring you several hundred thousand dollars,' wrote Mr. Barnum's partner to the Wright brothers. 'We'll turn your plane into a sort of travelling show, and we'll charge admission to all those who want to see it fly.'

The brothers emphatically rejected the offer. They were not showmen, they explained, but engineers. They were interested in doing a good job and not in making a big profit.

Moreover, they added, they couldn't afford the time for circus stunts; they still had considerable work to do in order to make a machine that would be both speedy and safe.

The circus man shook his head. He couldn't understand anybody who would turn down such a golden opportunity for fame and fortune.

So the brothers returned to their obscure shop and the building of the plane for the next year's tests.

CHAPTER XIII

'WE'RE NOT INTERESTED IN THE OHIO CRANKS . . .'

THE new plane was bigger and stronger than the others. And it had a seat for the driver. Wilbur and Orville no longer had to lie down when they operated the controls.

But it still had a number of faults. The wings had a tendency to dip too far when the machine made a turn to the right or left. This tendency resulted in many a near accident and in two or three almost fatal crashes.

'What is it that causes this dangerous dip?' asked Orville. 'Especially when we make a turn or go around in a circle.'

For several months they found no answer to this question. But finally, after a long and painstaking study, Wilbur was able to find it. 'The answer is so simple,' he said to Orville, 'I'm surprised we didn't get it sooner.'

'What is it?'

'Centrifugal force—the tendency of an object to shoot away from the centre of the circle in which it is flying.'

Orville nodded. 'I think you're right!'

'When the plane makes a sharp turn,' continued Wilbur, 'there is a force that pulls it away from the turn.'

'So we must do something to stop this force,' suggested Orville, 'or at least to weaken its pull.'

'Precisely. The thing to do, it seems to me, is to tilt the nose downward when we steer the plane into a turn.'

'Yes,' agreed Orville. 'The tilting of the nose should counterbalance the pull of the centrifugal force.'

'Sounds reasonable enough. At any rate, it's worth trying.'

They tried it, and it worked. By the end of September 1905 their plane was able to start, fly and make all sorts of turns, without any mishaps.

From then on, they made rapid progress. On September 27th they stayed up eighteen minutes and covered eleven miles. Day by day they increased their time and distance in the air until, on October 2nd, they stayed up almost three-quarters of an hour and cruised around in a circle over a total of twenty-four miles.

The successful navigation of the air had become an established fact. The public was now growing aware of the new miracle. Crowds of curious spectators came to witness the flights on Huffman Prairie. Many of them asked the brothers to explain the secret of their 'magic'. One of the spectators wanted to know how the plane managed to stay up in the air. 'What is it that keeps it from falling down?'

'Its speed,' replied Wilbur.

'What do you mean?'

'I mean it goes so fast, it has no time to fall.'

'You're not kidding us?'

'Not at all. You see, it acts like a skater on thin ice. So long as he skims rapidly over the ice, he moves his weight too fast to produce any undue strain on the surface. But the moment he stops, he crashes through the ice. Keep your plane moving, and you're safe.'

'But how do you get it to move in the first place?'

Very patiently Wilbur explained the process. 'Suppose,' he began, 'you get ready for a flight.'

'Do you mean *really*?' cried the startled spectator.

'No, not really,' laughed Wilbur, 'just theoretically. Imagine yourself in the seat on the lower wing of the plane. The machine, fastened down by a cable, is placed upon a track facing the wind. The engine is started, the propellers



begin to whirr, the cable is slipped from the anchor, and the machine shoots ahead.'

'I feel sick already!' exclaimed the spectator.

'But you're still on the ground,' laughed Wilbur. 'So let's go on. Your machine, pushed by the motor, gathers speed as it rides along the track. Just before you reach the end of the track, you turn the elevator upward, and the machine rises like a kite in the wind.'

'Is this all there is to it?'

'Not all,' said Wilbur, 'but enough to help you understand the take-off.'

'And how do you manage the go-down—I mean, how do you stop the machine?'

'You shut off the motor and the machine coasts down the wind like a toboggan sliding down a hill. It touches the ground at an easy angle, coasts along for about a hundred feet, and comes to a stop.'

The spectator breathed a sigh of relief, as if he had just finished a perilous flight. 'The way you explain it,' he said, 'it sounds so easy!'

'It is easy, once you have learned the trick.'

Though always prepared to answer questions, the two brothers made no effort to seek publicity for their flights. Yet gradually the world became aware of their work, and some of the more serious magazines began to publish articles about them. The writers of those articles admired not only their 'magic' but their modesty.

'In all the history of invention,' declared the editor of the *Scientific American* (December 15th, 1906), 'there is probably no parallel to the unostentatious manner in which the Wright brothers of Dayton, Ohio, ushered into the world their epoch-making invention of the first successful flying machine.'

In official circles, however, the brothers still failed to get any recognition whatsoever. After their successful flights at Huffman Prairie, they wrote to Washington offering to sell their plane and their services to the government. They were now convinced that their invention would prove to be of the utmost value—both for military manœuvres and for civilian travel. But the government thought otherwise. After a long wait, the brothers got their reply:

We cannot consider your suggestion that we buy your inventions or that we send a commission to investigate them. We have neither time nor money to waste on a couple of Ohio cranks. We are not interested.

This was a severe blow to the two brothers. Their savings were running out, and they needed more capital not only to develop their invention but to meet their living expenses. 'All our experiments,' wrote Orville, 'have been conducted entirely at our own cost. In the beginning we had no thought of recovering what we were expending. Later, when a successful flight had been made with a motor, we gave up the [bicycle] business in which we were

engaged, to devote our entire time and capital to the development of a machine for practical purposes.'

And thus the rebuff of the American government had brought them to what seemed like a dead end. They were still determined to remain scientists instead of becoming showmen. They refused every offer to turn their invention into a public exhibition for profit. Moreover, no American manufacturer as yet dared to undertake the building of planes on a large scale for general use. So there was only one thing for them to do. They decided to offer their invention to some of the governments in Europe.

The Wright brothers had good reason for expecting better treatment in Europe. The European countries were more likely to see the military possibilities of the aeroplane. This was an unfortunate situation but a grim fact. America, with its vast territory and friendly neighbours in the North and the South, was a peaceful nation. But the European nations, closely packed together with hostility lurking on every side, couldn't help being war-conscious. They had been fighting for over two thousand years, and they were always looking for newer and better military weapons.

Indeed one nation—France—had shown great interest in the Wright machine. The two brothers, like all intelligent people, hated war. But they couldn't blink at the facts. France was already experimenting with a plane built by Alberto Santos-Dumont about two years after the first successful flight of the Wright brothers. Other French experimenters were also making rapid progress in the field. But the Wright machine was still the first and the best of them all.

So the Wrights turned to France; or, rather, France turned to the Wrights. A group of three businessmen, encouraged by the French government, invited Wilbur and Orville to Paris in 1907.

They accepted the invitation. But before going, they decided to 'brush up' their flying technique a bit. They

had been out of practice for several months now. They built a new plane and prepared to put it to the test. It was with renewed hope that they now began their final experiments. They had a definite goal to work for.

CHAPTER XIV

'TOO GOOD TO BE TRUE...'

WILBUR sailed for France before his brother. Both of them hoped to develop their plane not as a machine to *wage* war but as an instrument to *stop* war. They believed that they had invented the ultimate weapon—at that time, of course, nobody even dreamed of any such thing as a nuclear bomb. 'I think,' said Wilbur, 'no nation will dare to start a war that will expose its people to the terrors of an air attack.'

It was therefore with a clear conscience that they were ready to sell their invention to the French or any other government. They wanted their plane to put an end to the 'wholesale slaughter of mankind'.

Their offer, therefore, was still open to the entire world. It was not confined to France. On his way to Paris, Wilbur stopped in England. Perhaps the British government or some private company would be ready to use his invention.

As Wilbur disembarked in England, Hart O. Berg, an American businessman travelling in Europe, met him at the boat. 'I knew him at once,' wrote Mr. Berg. 'There was a modest self-assurance about him that tallied with his character as I had heard about it.'

After the usual greetings, Mr. Berg said, 'Let me take your suitcase, and then we'll pick up the rest of your luggage.'

'The suitcase,' said Wilbur, 'is all the luggage I have.'

Wilbur, with Berg's assistance, tried to sell his invention in England—but without success. Together they took a boat to France. On the way across the English Channel, Mr. Berg asked Wilbur whether he and Orville were married.

'No,' smiled Wilbur. 'Neither of us can support a wife and a flying machine at the same time.'

Shortly after Wilbur's arrival in Paris, Orville came to join him there. While crossing the English Channel, Orville showed that he had an amazing memory—a trait shared by many of the great inventors. While walking on the deck one day, he was introduced to a stranger. 'Pardon me, sir,' he said, 'but haven't we met before?'

'I don't think so,' replied the stranger. 'I note by your accent that you are an American, but I am an Englishman.'

'Have you ever been to America?'

'Yes, on one occasion.'

'Was it at the World's Fair in Chicago, back in 1893?'

'Yes.'

'At that time, sir, did you by any chance explain some sort of gadget to another man?'

'Now that you mention it, I believe I did.'

'That was the time I met you, but your back was turned to me at the time so I couldn't see your face.'

'Then how in the world did you recognize me just now?'

'By your voice, sir,' said Orville. 'I was sure I remembered your voice.'

The two brothers stayed in Paris for some time—but to no purpose. After considerable investigation of the Wrights' claim, the French government decided against buying the invention. 'We don't believe it can be put to practical use,' they said.

Disheartened at their failure, the brothers tried to sell their invention in Germany. Here, it seemed for a while, they would have better luck. The officials of the German government listened attentively when Wilbur explained that he and Orville would deliver a machine capable of flying at 40 miles an hour and carrying two men and a supply of fuel for a flight of 125 miles.

Yet when it came to drawing up a contract for this

machine, the officials hesitated. The promise of the Wright brothers seemed too good to be true. 'We give you our word of honour that we shall buy your plane if it does all you say it can do. But no signed contract, if you please.'

The Wrights had to be satisfied with this verbal promise. They returned to America without having made a single actual sale in Europe.

On their arrival in the United States, however, they were introduced to a young man who had good news for them. This young man, Frank P. Lahm, was a lieutenant in the Signal Corps of the War Department. He had spent some time as an instructor at West Point, and he had made a thorough study of the possibilities of the Wright machine. 'I am trying to get a definite offer from the American government for your machine.'

This time the government decided to make the offer. The news trickled out to the public, and once again the reporters and editors got busy ridiculing both the government and the inventors. 'One might be inclined to assume [from the action of the government] that the era of practical human flight had arrived,' said the *New York Globe*. 'A very brief examination of the facts, however, suffices to prove this assumption a delusion.'

And the *American Magazine of Aeronautics* declared, with equal emphasis: 'There is not a known flying machine in the world which can live up to the claim of the Wright brothers. . . . Perhaps the United States Army has been too much influenced by the "hot air" of theorizers. . . . Talk is their stock in trade. . . . Why is not the experience with Professor Langley a good guide?'

But in spite of all this ridicule the government, urged by the enthusiasm of Lieutenant Lahm, agreed on February 8th, 1908 to pay the brothers \$25,000 for a plane to be delivered in 200 days.

This was but the beginning of brighter days for the brothers. Three weeks after the American acceptance of

their plane, a syndicate of French businessmen agreed to buy 'the rights to manufacture, sell, or license the use of the Wright plane in France'.

It now remained for the brothers to build their new planes and to prove their practical value to the world. For two and a half years the brothers had done no flying. They were too busy with their efforts to sell their invention in the United States and abroad. So they returned to Kitty Hawk to get more experience with their new and improved machine.

It was on April 25th, 1908, that they were ready for the first new test. Now that they had sold their invention to two governments, they expected many reporters to witness their flights.

But they were disappointed. The reporters were still reluctant to believe in the miracle. Just a handful of them came, out of curiosity. One of them wired to his editor that the Wright machine had flown 1,000 feet, and the editor in a return wire replied: CUT OUT THAT WILD-CAT STUFF.

At about the same time H. G. Wells brought out a new novel, *Tono Bungay*. In this novel he described a flight made by his hero in a machine similar to that of the Wright brothers. One of the leading book reviewers praised the whole book as very realistic except for that 'crazy passage about the flying machine'.

One reporter, however, recognized the miracle of the Wright flights. On May 14th this reporter, Byron R. Newton, witnessed a spectacle never seen before—'a flying machine carrying *two* men instead of one'. That evening he wrote in his diary: 'Some day Congress will erect a monument here to these Wrights.'

This prediction came true in November 1932, when a 60-foot monument ordered by an act of Congress was dedicated to the Wrights on Kill Devil Hill. But in 1908, when Mr. Newton sent an article about the two-passenger

flight to a leading magazine, the editor returned it with the comment: 'While your manuscript has been read with much interest, it does not seem to qualify either as fact or fiction.'

CHAPTER XV

AT LAST AMERICA BELIEVED

THE brothers now decided to divide their energy. Wilbur went to France and Orville remained in the United States. In this way they could demonstrate their flights to both countries at once. Both brothers had new machines for their tests.

Orville made his tests at Fort Meyer, an army post near Washington. As he travelled on the tramcar from his Washington Hotel to the fort, nobody suspected that this unassuming passenger was on his way to introduce a new era into the world—the age of human flight. And when he arrived at the fort, he was met with hostile glances and subdued whispers. He overheard one of the whispers: ‘So this guy thinks he’s going to fly!’ Orville smiled grimly, but said nothing.

The truth of the matter was that he, too, had his doubts at that moment. The area from which he was to start was far smaller than any of the fields used in his earlier experiments. The government was determined to make the tests as difficult as possible. ‘And,’ conceded Orville, ‘I think the government is right.’

So he was extremely cautious when he stepped into the plane. The narrow field was almost completely surrounded by spectators—several hundred had come to see the first test. A horrible thought struck him: Suppose I hit some of these people at the take-off?

But he immediately collected himself. He was not the nervous type. ‘The best way to avoid accidents is to take the utmost care.’ He started the motor, took the controls and lifted the plane into the air without any mishap.

The spectators craned their necks, as a cry of amazement followed the plane into the air. One of the spectators was Theodore Roosevelt, Jr., the son of the President. He reported the historic event to his father. 'The people,' he said, 'went crazy. They could hardly believe their eyes. Their astonishment was not only at the wonder of it, but because it was so unexpected. I'll never forget the impression the sound from the crowd made on me. It was a sound of complete surprise.'

Orville waved his hand in answer to the shout and began to circle the field. He went round it twice and then came down. It was enough, he felt, for the first test.

When he reached the ground, a reporter rushed up to interview him. But for a time the newspaperman was unable to speak. His voice was choked as the tears came streaming down his cheeks.

Yet even then only a few newspapers reported the flight—and not one of them printed the story on the front page. The *New York World* briefly described the test on page 5, emphasizing not so much the wonder of the plane as the reaction of the spectators who were 'in fear of being struck by the vessel'.

Orville made several other flights at Fort Meyer, the climax being his dramatic exploit on September 7th, 1908, when he circled the field fifty-five times and stayed in the air for over an hour.

Then he startled the spectators—there were several thousand of them present at the time—with a new feat. That morning he had heard about a conversation held between a reporter and Professor Simon Newcomb. This professor, Orville recalled, had once flatly denied that *any man* could ever fly. And now he was equally emphatic in his denial that *two men* could fly in one plane. Orville was determined to prove that the professor was as wrong now as he had been in the first place.

So he invited his friend Lieutenant Lahm to go up into

the air with him as his passenger. Once more the crowd gasped as the plane, carrying the two men, circled the field and came down again safe and sound.

But Orville's next flight with two men on board ended in tragedy. Something went wrong; the plane crashed; and Orville's passenger, Lieutenant Thomas Selfridge, was killed. Orville was seriously hurt but managed to escape with his life.

This time a number of newspapers found room for the story on their front page. And thus it was through a fatal accident, and not through a series of successful flights, that the American public became aware of the new age of aerial navigation.

While he was recovering from the accident, Orville studied the cause of the crash. He learned that the fault lay not in the structure of the plane but in the weakness of one of the propellers. The blade had broken in two, and one of the fragments had struck and loosened a wire that controlled the elevator of the machine. This defect could easily be remedied—the propellers could be made of stronger material, and a similar accident need never happen again.

The tragedy, of course, was a terrible thing. But it was the exception to the rule. And the rule, established over a series of hundreds of successful flights, was that the era of aviation had come to stay.

One day shortly after the crash, a friend came to visit Orville, 'Has the accident got you?'

'Got me? What do you mean?'

'I mean, will you be afraid to fly again?'

'The only thing I'm afraid of,' said Orville, 'is that I won't recover *soon* enough to fly again. I'm anxious to go into the air right now!'

He did recover within a short time and went right ahead making longer and longer flights until America became convinced that the glory of air travel was now an established fact.



CHAPTER XVI

AND SO DID FRANCE

IN France, Wilbur even surpassed the records established by his younger brother in America. He made his flights at Le Mans, about 125 miles from Paris. Just before his first flight, he met with an accident. While he was working on the cooling system of his plane, the hot water from a broken rubber connection scalded his left arm. This accident delayed him for several days, and the newspapers began to print sarcastic stories about him. They called him '*le bluffeur*' (the bluffer) and they declared that he was using his injury as an excuse. They had never expected him to fly in the first place, they said.

Yet there was a big crowd present when he was ready for the flight. The people, accustomed to the French love for display, were surprised at the simplicity of his appearance. He wore no special uniform, just a plain grey business suit and a cap.

As the plane left the ground, there was an outburst of excited voices. '*Il n'est pas bluffeur!*' '*Il a conquis l'air!*' (He is no bluffer! He has conquered the air!)

When he brought the machine to the ground, there was a rush of spectators eager to salute him in the French manner—with a kiss on both cheeks.

The only one who seemed unexcited was Wilbur himself. When a reporter asked him if he was satisfied with his first flight, he replied: 'Not altogether. When I was in the air, I made at least ten mistakes. You see, I was out of practice for several months. But,' he added, 'I'll do better next time.'

And he did. The papers were now lavish in their praise.

They called his flights 'not only a success but a triumph'. Wilbur Wright had become the most celebrated man in France. He was overwhelmed with invitations to all sorts of parties, but for a time he refused to accept any of them. 'I just want to be left alone so that I can keep on improving my plane.'

His improvements were so successful that in his later flights he was able to make not only circles in the air but more complicated curves such as the figure 8. All France was flooded with picture post-cards of Wilbur Wright and his plane. He received visits from the heads of several countries. Yet he remained throughout the modest, simple mechanic of an obscure American town.

In his conversations with the great, he was never forward, yet never shy. He met them on an equal footing, as man to man.

Finally he yielded to the pressure of the public and accepted an invitation to a dinner given in his honour by the French Aero Club. At the end of the dinner there was a clamour for a speech from 'Monsieur Wright'. Wilbur, always reluctant to speak in public, stood up and made just a few remarks:

'I know of only one bird, the parrot, that talks. And the parrot can't fly very high.'

From day to day now, Wilbur was able to fly higher, stay up longer and cover greater distances in the air. Many scientists from other countries came to France to witness his flights. One of these men was Major Baden-Powell, President of the Aeronautical Society of Great Britain and brother of the founder of the Boy Scouts. 'It is beyond dispute,' was his enthusiastic report, 'that Wilbur Wright is in possession of a power which controls the fate of nations.'

Wilbur was now taking passengers with him on many of his flights. Yet he refused to accept payment for any of these trips. 'I've never seen another man like him,' re-

marked an astonished reporter. 'Refuses money when it's thrown in his lap.'

One of Wilbur's passengers was Mrs. Berg, the wife of Hart O. Berg, his first sponsor in Paris. When Mrs. Berg sat down in the plane, her husband tied a rope round her skirt just below the knees to keep it from blowing in the wind. In those days, as you know, ladies' skirts reached right down to the ankles. Among the people who witnessed that flight was a Paris dressmaker. The 'hobble' around Mrs. Berg's skirt gave him an idea. He went home and designed the 'hobble skirt'—a garment drawn so tight between the ankles and the knees that the wearer almost had to hop instead of walk. For a time this 'hobble skirt' became very fashionable among women all over the world.

Wilbur continued his flights, taking women as well as men into the air, astounding everybody with his exploits and winning several prizes for his long flights—one of them lasting almost two and a half hours.

At the end of December 1908 it became too cold to fly at Le Mans. So Wilbur took his plane to Pau in southern France.

Just before he left for Pau, his brother Orville and his sister Katherine joined him. On their way south, the Wrights experienced another of their miraculous escapes—this time, however, not from a plane but from a train crash. The train in which they were travelling jumped the rails. Two passengers were killed, but the Wrights were only shaken up. 'It seems,' smiled Katherine, 'as if heaven is saving you for your great work.'

During their stay at Pau, the Wrights made no further attempts at any record flights. Instead, they spent their time teaching others to fly. The era of air travel was now in full swing, and many young men—and a few young women, too—were anxious to take up aviation as a profession.

The Wrights were now world-famous. Among the emi-

nent people who came to visit them were King Edward VII of England and King Alfonso of Spain. When the Wrights were introduced to King Alfonso, Wilbur said: 'A great honour and pleasure to meet you.'

Whereupon the king responded, 'A still greater honour and pleasure to meet *you*.'

Yet in spite of all these distinctions, the Wrights remained as unspoiled as ever. A newspaper hailed them as Kings of the Air. Wilbur modestly objected to this title. 'Orville and I,' he said, 'prefer to be called Citizens of the United States.'

Everybody noticed this modest simplicity of their character. The Europeans, accustomed to the dignity of honours and titles, were delighted to see this new kind of dignity—the independence of two young Americans whose only desire for glory was the knowledge of a job well done. One of the visitors at Pau, Lord Northcliffe, made this observation about them:

I never knew more simple, unaffected people than Wilbur and Orville. They had become world heroes, and their demonstrations were witnessed by thousands of people from all parts of Europe—by kings and lesser men; but I don't think the excitement and interest produced by their extraordinary feat had any effect on them at all.

They were not even excited when they saw a cartoon depicting them as Uncle Sam soaring on two wings, one spread out over America and the other across the Atlantic over Europe. 'This cartoon,' said Orville, 'claims rather too much for us. All we have done is to demonstrate the possibility of flight. It is now up to other, more skilful fliers than ourselves to develop this possibility throughout the world.'

CHAPTER XVII

FURTHER HONOURS, AND THEN TRAGEDY

BEFORE returning to America, the brothers went to England where many attempts were made to entertain them. They accepted only a few of the many invitations they received. They would have preferred to accept none at all, but they didn't want to appear to be a couple of unsociable cranks.

As they arrived at one of the banquets, a fellow guest explained to them how they would recognize the president of the Aeronautical Club. 'He's quite easy to spot, you know. He has the distinction of being the ugliest man in the world.'

'I'm afraid,' laughed Wilbur, 'he'll lose the distinction at this banquet. With the club president, and Orville and myself seated around the table, you'll see the *three* ugliest men in the world.'

The brothers returned to Dayton in June 1909. They were greeted with a 'home-coming' celebration that lasted two days. On the morning of the first day they were awakened by a deafening crash. 'Where's the earthquake?' shouted Orville as he jumped out of bed.

It was no earthquake, however, but the combined sound of every factory whistle and every church bell in Dayton. This was followed by the booming of cannons and the blaring of bands. At ten o'clock they were escorted to a carriage that took them on a triumphal ride through the principal streets of the city.

Two of their boyhood friends—Ed Sines and another young man by the name of Ed Ellis—went with them in



the carriage. Sines and Ellis decided to play a joke on Wilbur and Orville. Pretending they were the Wright brothers, they solemnly shook hands with all those who came to greet the heroes while Wilbur and Orville sat back quietly and enjoyed the fun.

After the festivities the Wrights continued to astonish the world with the performances of their aeroplane. On July 30th, Orville made the first sustained aerial trip—a flight that covered a distance of about 10 miles. On September 29th, while Orville was demonstrating his plane in Germany at the invitation of the Kaiser, Wilbur flew over 21 miles up the Hudson River, in New York, and back again to his starting point. This flight was witnessed by millions of people who were lined up on both sides of the river. And only two years later one of the pilots they had trained—Mr. Cal P. Rogers—electrified the world by making a transcontinental flight from New York to California!

Three countries—America, France and Germany—had now bought the manufacturing rights in their machine. The two brothers had set up a factory in Dayton and were

well on the way to fortune in addition to their fame, when suddenly they received a tragic blow. Early in May 1912, Wilbur was taken ill. At first the doctors thought it was a simple case of indigestion. Wilbur, too, made light of it. 'I'll be all right again in a day or two,' he said.

But he grew steadily worse. The doctors diagnosed the case as typhoid fever.

Even now for a time there seemed to be no special reason for worry. It looked like a mild case of the disease.

But after ten days he grew definitely worse. The fever was taking its toll of his weakened constitution. 'It looks quite serious,' said the doctors.

For a time he hovered between life and death. On some days he rallied so much that the doctors began to hope he would pull through. But their hope was vain. On Wednesday, May 29th, he took a turn for the worse; and just before dawn on the Thursday morning he died.

His death was a blow to the entire world. But most of all it affected Orville. 'Wilbur was like a part of myself,' he said. His brother was only forty-five when he died.

In spite of his grief, Orville went on with his work. The growth of the Wright factory was bringing new responsibilities to him all the time. There were lawsuits for the infringement of his patents, a flood in Dayton that almost wrecked his factory, a new Wright Company to be set up in England, and the training of hundreds of student fliers to carry on with the conquest of air navigation.

But one of his most important tasks was to establish his own and Wilbur's claim to recognition as the original pioneers of the air. For the American government was still disputing that claim.

CHAPTER XVIII

THE EXILE AND THE RETURN OF THE WRIGHT PLANE

IN the city of Washington there is a building called the Smithsonian Institution. This building is devoted to the spreading of knowledge, especially in the field of science. It contains a museum of all the great American inventions. One of the proudest possessions in this collection, as Orville and almost everybody else believed, would be the glider he and Wilbur had flown at Kitty Hawk. It was the first example of a successful human flight in a heavier-than-air machine.

But the officers of the Smithsonian Institution felt differently about it. Instead of accepting the invention of the Wright plane which *did* fly, they chose the Langley plane which did *not* fly. They put the Langley machine into the Smithsonian Institution as the first successful aeroplane, and they merely asked Orville to send them a small model of his own plane.

It was like asking Orville to play second fiddle, and to play on a toy fiddle at that! He refused to send them the model; but instead, he sent the original Kitty Hawk machine (in 1928) to the Science Museum in London, where it was immediately acknowledged as the pioneer in air flight.

And thus it was in a foreign country that the great American inventor had to seek his first official credit as an aviation pioneer. 'It is with deep regret,' he wrote, 'that this old machine must leave our country. But I believe my course in sending our Kitty Hawk machine to a foreign

museum is the only way of correcting the history of the flying machine.'

For a number of years his machine remained an exile in England. But the leading scientists of America—and, indeed, of the entire world—insisted that the wrong be righted. Finally there was a new secretary, Dr. C. G. Abbot, appointed at the Smithsonian Institution. He listened to the verdict of the scientists and sent a letter of apology to Orville:

It is everywhere acknowledged that the Wright brothers were the first to make sustained flights in a heavier-than-air machine at Kitty Hawk, North Carolina, on December 17th, 1903. . . . It is to be regretted that the Institution published statements . . . to the effect that . . . Langley's plane was the first heavier-than-air machine capable of maintaining sustained human flight.

He followed this statement with an invitation for the return of the Wright plane to America.

If the publication of this statement should clear the way for Mr. Wright to bring back to America the Kitty Hawk machine to which all the world awards first place, it will be a source of profound and enduring gratification to his countrymen everywhere. Should he decide to deposit the plane in the Smithsonian Institution, it would be given the highest place of honour, which is its due.

Orville accepted the apology and the offer. And thus the Wright plane was about to be returned from its exile.

But it was not until after Orville's death (at the age of seventy-six) that the plane came back to the United States. He died on January 30th, 1948; and the plane was installed in the Smithsonian Institution towards the end of

that year. On December 17th, 1948, it was formally dedicated in the presence of many distinguished guests. This was the forty-fifth anniversary of one of history's supreme miracles—the first human flight in the air.